METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD & COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

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Vol. 32 NEW YORK, FEBRUARY, 1934 No. 2

Codes Effective for the Brass Foundries and the Ingot Makers

Abstracts of Codes Now in Force for These Two Industries

CODES were signed by the President and went into effect, late in December for two important branches of the metal industries: (1) The Industry engaged in Smelting and Refining Secondary Metals into Brass and Bronze Alloys in Ingot Form, and (2) The Non-Ferrous Foundry Industry. Complete copies of these Codes can be obtained from the Superintendent of Documents, Washington, D. C. Extended abstracts are given below.

Code of Fair Competition for the Industry Engaged in the Smelting and Refining of Secondary Metals into Brass and Bronze Alloys in Ingot Form. Effective January 2, 1934.

The industry includes all producers engaged in the smelting and refining of secondary metals into brass and bronze alloys in ingot form.

The general provisions in all Codes appear in this Code, covering Child Labor, the right of labor to collective bargaining, etc. Points of special application are as follows:

Working Hours

The standard work week of the industry shall not exceed 40 hours per week, except during peak periods which are limited to 6 weeks in any 6 months. Provided, however, that no employee shall be employed more than 6 days or more than 48 hours in any one week, or more than 10 hours in any one day.

The above hours shall not apply to any employees in the case of emergencies where the safety of men or the protection or preservation of property necessitates longer hours; nor shall they apply to employees in executive, supervisory or technical capacities, receiving $35.00 or more per week, or outside salesmen; nor to watchmen, who may be employed not to exceed 56 hours in any one week, and not more than 6 days in any one week.

Employees working in excess of 40 hours per week shall be paid not less than one and one-half times their normal rate.

Wages

Office employees shall be paid not less than at the rate of $15.00 per week, except that office boys and girls may be paid at the rate of $12.00 per week. The number of such office boys and girls shall not exceed 5% of the total number of office employees, except that each office may have one such office boy or girl.

The minimum wage per hour which shall be paid to other employees in the industry shall be at the rate of 35c per hour, except as herein otherwise provided.

Learners shall be paid not less than 80% of the minimum wage, and the total number of such learners shall not exceed 5% of the number of employees of such employer. The learning period shall not exceed 3 months.

Equitable adjustments shall be made of the wages of employees now receiving more than the minimum wage as herein provided.

Standards for Safety and Health.—Every employer shall make reasonable provision for the safety and health of his employees at the place and during the hours of their employment.

Standards for safety and health shall be submitted by the Code Authority to the Administrator within six (6) months after the effective date of this Code.

Marketing and Trade Practice Rules

Each member of the industry shall file with the Code Authority the prices at which he is offering his products for sale; which prices shall not be less than his current cost as determined by a uniform system of cost accounting, and provided, that any member of the industry may file prices below his current cost so determined in order to meet the competition of any other member of the industry who has filed prices in accordance with this Section.

In determining current cost, the cost of raw materials used in the manufactured product shall be computed on the basis of the replacement cost thereof prevailing as of the date of sale.

Any member of the industry desiring to change the price or prices of his products shall notify the Code Authority of all changes to be made sufficiently in advance thereof so that the Code Authority will receive such notice at least one day previous to such change.

Published prices shall include terms of payment, length of bookings or contracts, and F. O. B. point and such other provisions as may be necessary to fully inform the trade of all conditions of sale.

Terms of sale shall be fully stated and strictly adhered to and invoice shall show same.

There shall be no discrimination between customers. Difference in price based upon quantity shall not constitute discrimination.

Prices and discounts shall be openly and publicly announced.

A uniform sales contract shall be established and used by the industry.

All contracts shall be equally binding upon both parties and are not subject to repudiation.

Unfair Trade Practices

Selling below openly and publicly announced prices and terms.

Secret allowances or secret rebates of any kind.

False dating of contracts or billings.

Allowances by any name or of any nature which are not justified by the facts and are made in collusion with the buyer.

Storage of products of the industry in consumers' warehouses, or sales on consignment to consumers, except under circumstances to be defined by the Code Authority.

Special services or privileges to certain purchasers when not extended to all purchasers.

Making false or misleading statements about competitors' products or regarding a competitor.

False or misleading advertising, mislabeling or misbranding.

The adoption of brands (either in design or name) which so closely approximate the brands or trade marks of a competitor as to deceive or confuse a buyer.

Inducing or attempting to induce a breach or a cancellation of a contract between a competitor and his customer.

Maliciously enticing away the employees of a competitor. Nothing herein shall prevent any employee from offering his services to a competitor or prevent any member from employing an employee of another member where the initiative in such change of employment comes solely from the employee.

Commercial bribery.

Guaranty against decline in price.

Payment of brokerage in excess of the usual and customary commission.

Every member of the industry shall use a cost accounting system which conforms to the principles of and is at least as detailed and complete as the uniform method of costing to be prescribed by the Code Authority and approved by the Administrator.

No provision of this Code relating to prices or terms of selling, shipping or marketing, shall apply to export trade or sales or shipments for export trade of unfabricated products of this industry.

The Code Authority has its headquarters at 308 West Washington Street, Chicago, Ill. R. D. T. Hollowell is its Secretary-Treasurer.

Code of Fair Competition for the Non-Ferrous Foundry Industry Effective December 28, 1933

Accompanying the Code was the following letter from Administrator Hugh S. Johnson:

Resume of Code as to Wages and Hours

"The Basic Code provides a 40-hour week for all employees, except those performing executive or technical work, and members of their staffs individually receiving pay at the rate of at least $35.00 per week. Peak period employment is allowed not to exceed 48 hours per week for not more than four weeks in any six months' period with a 6-day week. The peculiarities of foundry production make it impossible on frequent occasions to complete foundry processes within an exact 8-hour day, but the principle of the 8-hour day is recognized by a statement in the Code.

"Melters, engineers, and firemen may be employed not more than 10% longer hours than other factory employees, but the number shall not exceed 3% of the total number of employees.

"Repair employees may be employed 10% longer than regular hours in case of emergency.

"Watchmen may be employed 56 hours per week.

"Child labor is prohibited and no person under 18 years of age may be employed in any dangerous and hazardous occupations.

"Minimum rates of pay are 32c per hour in the southern district for males and 27c per hour for females; and 40c per hour in the northern district for males and 35c for females, with not less than 80% for learners (for a period of not exceeding 90 days) apprentices (for a period of not exceeding one year) and superannuated and maimed employees. Not more than 5% of the total number of employees may be included in the classifications receiving less than the

minimum rates of pay. Equitable adjustment is provided for all wages above the minima.

General Statement

"This industry consists of establishments engaged in the manufacture of aluminum, antimony, bismuth, cadmium, cobalt, copper, lead magnesium, nickel, tin, zinc, and alloy castings, with certain definitely stated exceptions. It consists of approximately 1,500 plants most of which are small units employing only a few workers.

"The Association presents the following figures:

Invested capital	$40,000,000
Present sales volume	$ 3,300,000
Production capacity, lbs. per month	60,000,000
Production rate at present, lbs. per month	21,700,000
Present number of employees	14,000

"Statistical information is exceedingly meagre, and has been gathered only by the Industry, which has compiled some basic figures beginning in 1928.

"These statistics indicate that in 1928 and 1929 approximately 97% of the concerns in the industry were operating on a schedule of hours greater than 40 hours per week, and that during the first portion of 1933 approximately 67% of the concerns were operating under such a schedule. Setting a maximum of 40 hours per week, therefore, will materially increase the number of employees.

"Pertinent figures relative to labor and wages since 1928 are as follows:

	Est number of employees	Av'ge min. weekly wage	Est. weekly pay roll
1928	17,000	$12.25	$450,000.00
1929	18,500	12.25	515,000.00
1st quarter 1933	12,000	9.00	265,000.00
July to Sept. 1933	14,000	11.75	334,000.00
Est. No. under code	15,800	{†16.00 {‡12.80	398,000.00

‡North. †South.

"The present volume of business in pounds production is estimated at 50% to 60% of 1929, whereas the value of said business in dollars is only 35% to 40% of the 1929 levels. With an improvement in general business conditions and an increase in the business of this industry to a normal of approximately 75% of 1928 to 1929 tonnages, the industry working under the Code will employ approximately 22,000 persons and will have an average weekly pay roll of approximately $550,000.00, or an increase in the pay roll of about $7,500,000.00 per year. It is evident, therefore, that the anticipated business expansion will result in greater employment within this industry than the 1929 peak.

"Provision is made that three representatives of the Administration, without vote, shall serve with the Code Authority. The supplementary codes submitted define certain sub-divisions of the industry, and outline fair trade practices for each of these sub-divisions. Provision is made for the submission of additional supplements by any other sub-divisions of the industry which may wish to file them.

"I believe that the Code and supplements are fair to industry, to labor and to the consumer, and in accordance with the intent and purpose of the National Industrial Recovery Act."

Points of Special Interest

The industry includes the business of producing non-ferrous castings except as produced and/or sold as a part of the products, including finished and semi-finished parts thereof, of an owning or an affiliated company, but not sold in the open market, as castings in competition with similar castings produced by other members of the industry, **provided however, that such term does not include the production of railroad car and locomotive journal bearings and castings, nor semifinished or finished street railway castings, and provided further that such term does not include the production of die castings and the production of aluminum alloy piston castings.**

The industry embraces two main groups of castings which are "Miscellaneous Non-Ferrous Castings" and "Specialty Non-Ferrous Castings."

The term "Non-Ferrous Castings" means castings made in the industry from aluminum, antimony, bismuth, cadmium, cobalt, copper, lead, magnesium, nickel (except nickel chromium alloys containing more than 5% of chromium), tin, zinc, and their alloys containing less than fifty percentum (50%) of iron, produced by any process (except those noted above).

The term "Miscellaneous Non-Ferrous Castings" means that group of non-ferrous castings produced in the rough or partially machined or finished by a member of the industry to the order of the buyer from the buyer's designs and specifications.

The term "Specialty Non-Ferrous Castings" means that group of cast non-ferrous products in the rough or partially machined or finished, designed and engineered by members of the industry producing them, produced from patterns and/or other production equipment belonging to the producer.

Supplement to the Code Submitted by the Miscellaneous Sand Castings Division

Unfair Methods of Competition

To undertake to do work or furnish castings on terms other than those set forth in the contract between the parties.

The payment or allowance of secret rebates, refunds, credits, unearned discounts.

To purchase from customers goods, scrap, borings, and/or services at prices higher than the market for the purpose of influencing or inducing the purchase of non-ferrous castings.

To absorb all or any part of the machining cost of castings sold as machined castings.

To enter into quantity contracts with buyers without obligation on their part to take delivery of the quantities specified in the contract or on the quotation, for the purpose of giving special unwarranted prices.

To accept requirements contracts without a specific minimum which shall not be less than 75% of the maximum and without specifying a time limit, except where such contracts permit of a price adjustment at least once monthly to conform with metal-market advances and/or declines.

To defame or disparage a competitor directly or indirectly.

Marking, branding, labeling products, and making statements regarding products, the purpose or effect of which may be misleading or tend to deceive purchasers as to the quantity, quality, grade, or substance of the goods purchased.

To cancel in whole or in part or voluntarily permit the cancellation in whole or in part of any contract of sale of any product, except for a fair consideration.

To make any sale or contract of sale of any product of any description guaranteeing against a metal market decline.

To make any sale or contract of sale for any cast-

ings below seller's cost as determined by a system of cost accounting which conforms to the principles of and is at least as detailed and complete as a uniform and standard method of cost accounting to be formulated and adopted by this Division and approved by the Administrator.

To guarantee the life or service of a non-ferrous casting.

To quote a flat price per pound for a variety of castings of widely varying weight and/or intricacy.

To absorb the cost of patterns, pattern alterations, tools, gauges, core drivers, chemical analyses and/or physical tests specified by the customer, or any special equipment in the cost price and/or charge for such equipment at less than its cost.

No provision of this supplemental Code shall be so construed as to hinder the development of new uses.

Supplement to the Code Submitted by the Aluminum Permanent Mold Castings Division

The aluminum permanent old casting industry includes that Division of the Non-Ferrous Foundry Industry, engaged in the business of producing aluminum and aluminum alloy castings made with permanent or semi-permanent molds, provided, however, that such term does not include the production of aluminum and aluminum alloy die castings and aluminum piston castings.

Unfair Methods of Competition

The same clauses as given above, with the following additions:

In the case of development of new uses and/or new processes the cost of the development or the excess cost of molds over their cost of their reproduction may not be charged to the customer.

To accept permanent mold equipment made by another permanent-mold manufacturer in this group and supplying production castings from such equipment.

To quote or accept orders for molds, dies, or any special equipment necessary to the manufacture of a particular casting without including in the quotation or order an amount separate and apart from the cost of the casting sufficient to cover the cost of such molds, dies, or other special equipment, or to extend terms for the sale of such molds, dies, or special equipment other than net cash on approval of samples or than the payment therefor in equal monthly installments covering a period of not to exceed six (6) months. In the event that installment terms as herein provided are granted, there should be added a carrying charge at the rate of two percent (2%) per month for such period of time as such terms are granted.

To make any additional mold equipment to meet a customer's production requirements, without charging for same at not less than cost.

To give any cash discount on billing or to extend terms of payment for the purchase of the products of the industry for more than thirty (30) days.

To accept orders which do not specify a definite quantity or which extend the time of delivery beyond one hundred and twenty (120) days from date of order for new castings or ninety (90) days from date of order on reorders of castings previously furnished.

To cancel or renew the unfilled balance of any order at a lower price without a charge equivalent to any loss occasioned by a decline in the value of the metal.

Fair Methods of Competition

All molds will remain in the foundries' possession and control, and when for three consecutive years, no orders are received, the molds will be considered obsolete and may be destroyed after giving 30 days' notice thereof to the customer. The process of construction and operating these molds will not be disclosed to anyone except employees of the foundry.

Supplement to the Code Submitted by the Steel and Rolling Mill Castings Division

The Steel and Rolling Mill Castings Industry includes that Division of the Non-Ferrous Industry engaged in the business of producing non-ferrous castings for steel plants and rolling mills except Blast Furnace Castings.

Unfair Methods of Competition

The same clauses as given above, with the following addition:

To accept any contract or order on a consignment basis.

Supplement to the Code Submitted by the Blast Furnace Castings Division

The "Blast Furnace Castings Industry" includes that Division of the Non-Ferrous Foundry Industry, engaged in the business of producing non-ferrous castings for blast furnaces, such as tuyeres, cinder notches, coolers, bosh mantle and inwall plates, hot blast valves and valve seats.

Unfair Methods of Competition

The same clauses as given above with the following additions:

To extend to any purchaser special concessions in the nature of free machining not standard as of July 1, 1933, and defined as follows:

Tuyeres—drill and tap holes.
Machine seat for blow pipe.
Cinder notches—tuyere coolers.
Notch (or intermediate) coolers.
Bosh plates, mantle (inwall) plates.
Drill and tap holes.

Hot blast valves and hot blast valve seats—Follow blueprint furnished by purchaser. To remachine a valve seat after it has been shipped to a purchaser (except to correct an error) constitutes an unfair method of competition.

To machine outside surface of tuyere fit or inside surface of cooler fit without charging purchaser full cost of such extra machining in addition to per-pound price constitutes an unfair method of competition. However, filing or grinding smooth where necessary is allowable without extra charge.

To requote a price lower than a competitor's price after being advised what that competitor's price is.

To accept any contract or order on a consignment basis or with the understanding that shipment is to be held back pending customer's specification, or on any other delivery basis than that of shipping when ready, and invoicing as of date of shipment and on terms specified.

Terms of payment shall be: net 30 days from date of shipment. A discount of ½ of 1% may be allowed for earlier payment.

All shipments shall be invoiced in cents per pound for the actual shipping weight.

The headquarters of the Code Authority are at 47 Fulton Street, New York. Sam Tour is Executive Secretary.

The Fallacy of Average Flat Prices for Castings

By F. N. FLYNN

Foundry Manager Arthur Harris & Co., Chicago

The Effect of the Depression on the Price of Castings in the Non-Ferrous Foundry

IN THE Chicago District there are about fifty non-ferrous foundries which sell castings to the trade. Even in normal business years competition is keen. In depression years, there is insufficient business to allow all foundries to operate continuously, even at very greatly reduced output.

With the smaller volume of business, the cost per pound of castings mounts rapidly, the increase being more pronounced in the jobbing foundry. The necessary overhead expense and the fixed capital charges, divided by the small tonnage, produces cost figures which are so high that one questions the advisability of continuing in a business which is constantly in red ink.

The inspection of such foundry cost sheets by any business man would bring but one recommendation—raise the selling price to at least cover the overhead expense and a part of the fixed charges. Following this line of reasoning, the foundryman must remember that he is now operating under a Code signed by the President, with unfair methods of competition defined as follows:—

Clause (m):- Make any sale or contract of sale of any castings below cost as determined by a system of costing, acceptable to the Association, which shall arrive at total costs.

Also, he must give consideration to—

Clause (o):- Quote a flat price per pound for a variety of castings of widely varying weight and/or intricacy.

Nearly all the non-ferrous foundries continue to hold to the old method of quoting a sales price to a particular customer, at an average price per pound for all his work, large, small, solid, cored or what have you. The only change of price considered is a change due to metal quotations for the particular alloy.

To illustrate the danger of flat price quotation, let us assume that the price was an average and fair at the time it was made. Meanwhile conditions change, and the average casting is much lighter. The cost per pound rises but the flat price remains. Meanwhile the foundry suffers the loss, hoping that some day conditions will be reversed when they will again receive orders for heavier castings.

Why should non-ferrous foundries bid average flat prices? It is an old custom. There is no other reason. The ferrous foundries abandoned the practice years ago. It will soon be abandoned by the non-ferrous foundries. Its abandonment will be equally beneficial to the foundries and the manufacturing industry.

Our own non-ferrous foundry, established in 1884, abandoned the flat price quotation in 1931, when we substituted the weight schedule, showing price differentials for various weights per casting, either solid or with dry sand cores. A copy of this schedule is attached. After more than two years experience with this schedule, we do not believe there is a single regular customer who would willingly return to the old flat price method of pricing.

Weight Schedule of Prices

Select the correct weight unit:—

(1) Single Pattern:- Weight per casting.
(2) Gated Patterns:- 50% of collective weight of castings on gate.
(3) Machine Match Plate Patterns:- Collective weight of castings per plate.
(4) Complicated castings quoted special.

		Pattern Castings			
Weight Unit		Copper Base Alloys		Aluminum Base Alloys	
Oz. equal	Lbs.	Solid	Cored	Solid	Cored
1	.06	+.48	+.55	+.96	+1.10
2	.125	+.40	+.47	+.80	+ .94
3	.19	+.33	+.40	+.66	+ .80
4	.25	+.27	+.34	+.54	+. 68
5	.31	+.22	+.29	+.44	+ .58
6	.375	+.18	+.24	+.36	+ .48
7	.44	+.15	+.21	+.30	+ .42
8	.50	+.13	+.19	+.26	+ .38
9	.56	+.12	+.18	+.24	+ .36
10	.625	+.11	+.17	+.22	+ .34
11	.69	+.10	+.15	+.20	+ .30
12	.75	+.09	+.14	+.18	+ .28
13	.81	+.08	+.13	+.16	+ .26
14	.875	+.07	+.12	+.14	+ .24
15	.94	+.06	+.11	+.12	+ .22
Lbs. to Lbs.					
1 to 2		+.05	+.10	+.10	+ .20
2 to 3		+.04	+.08	+.08	+ .16
3 to 4		+.03	+.07	+.06	+ .14
4 to 5		+.025	+.065	+.05	+ .13
5 to 6		+.02	+.06	+.04	+ .12
6 to 7		+.02	+.055	+.04	+ .11
7 to 8		+.015	+.05	+.03	+ .10
8 to 9		+.01	+.045	+.02	+ .09
9 to 10		+.005	+.04	+.01	+ .08
10 to 15		Base	+.035	Base	+ .07
15 to 25		—.005	+.03	—.01	+ .06
25 to 35		—.01	+.025	—.02	+ .05
35 to 50		—.015	+.02	—.03	+ .04
50 to 75		—.02	+.01	—.04	+ .02
Over 75		—.025	Base	—.05	Base

The non-ferrous foundries should adopt some sort of a weight schedule for self-protection. It should be put in force now. This can best be accomplished through their own local section of the Non-Ferrous Foundry Association.

Beryllium Copper

A Summary of the Progress of This New Alloy and Its Increasing Number of Uses

ONE of the outstanding developments in the past year or two in the non-ferrous metal field, has been the commercial application of a comparatively new metal—beryllium. In the pure state beryllium has few uses. It is one of the lightest metals, having a specific gravity of only 1.85. (Aluminum, about 2.75). Its melting point is 1280°±20°C (2336° ±36°F). It has a steel gray color and is very hard. It is found in a series of complex minerals, mostly silicates. It is a part of the gem beryl.

As a result of intensive researches during the last few years, beryllium has come out of the laboratory and into the plant. It is still very high in price, but used even in very small quantities, it imparts such extraordinary properties to copper that it has made an important place for itself.

Tests indicate that the use of from 1 to 2.5% beryllium, with the balance pure copper, gives a series of alloys with wide commercial usefulness. At the present time, beryllium copper alloys in the above range are commercially available in the form of castings, sheet, strip, rod, wire and tube in the sizes and gauges in which phosphor bronze is ordinarily furnished. It has been stated also that it will soon be available in the form of forgings, within certain manufacturing limitations.

Casting Practice

In order to obtain the proper percentage of beryllium use is made of a 12.5% master alloy (balance copper). This material is brittle and can easily be broken up into the proper weights. The formula for mixing is:

$$\frac{T\ Be_2}{Be_1} = \text{pounds of master alloy.}$$

Where T = total pounds of metal desired.

Be_2 = percent beryllium desired in final product.

Be_1 = percent beryllium in master alloy.

The copper is melted in a graphite crucible under a heavy covering of charcoal, or in the electric furnace. The melt is deoxidized with any one of a number of materials such as boronic copper, calcium, lithium, silicon, or magnesium. Borax glass may be used in addition to the charcoal for a covering. The copper bath is heated to a little above 2200°F. and small pieces of the 12.5% alloy added, stirring carefully with a graphite, Plumbago or nichrome rod so that the master alloy is not allowed to float. The mixture should be allowed to cool to 1900° to 2000°F; although at one foundry it is the practice to pour between 2000° and 2100°F. Careful pyrometric control is necessary.

The casting practice follows the usual methods employed in the foundry. Pour as quickly as possible at the proper temperature, after dissolving the master alloy. Keep the metal covered with charcoal. If cast iron molds are used, they should be well cleaned, warmed to about 250° to 300°F., and dressed with a coating of soot. Sand casting methods, in general, approximate the practice used with phosphor bronze. Green sand molds can be used. Linear shrinkage is about 3/16" per foot for the 2.5 percent beryllium copper alloy. The melting loss in 200-pound lots has been about 9 percent for both beryllium and copper. Rejections should not exceed 2 percent.

Beryllium has a very high deoxidizing power and for that reason it has been recommended in making copper castings, aside from its use as an alloying agent. In deoxidizing the standard practice is to add 0.01 to 0.02 percent beryllium.

Heat Treating Castings

Very interesting results can be obtained by heat treating beryllium copper castings. In general, the castings should be held at a maximum of 1475° to 1500°F. for at least two hours to insure the complete solution of any precipitated beryllium compounds. Careful pyrometric control is necessary because beryllium copper disintegrates at about 1550°F. After this "soaking", the castings are quenched in cold water with the minimum possible delay. The 2.5% alloy should have a Brinell hardness of about 100 and be readily machineable.

Precipitation Hardening

Beryllium copper alloys are susceptible to the heat treating process known as precipitation hardening, this treatment being applied to the annealed or solid solution castings. Keep the castings at 525-575°F., for the period of time necessary to insure complete precipitation. Higher temperatures cause re-absorption of the beryllium compounds and a decrease in hardness. A very slight decrease in volume results from precipitation hardening, about 0.001" per inch of diameter.

The heating period recommended for this treatment is about three hours. Electrical conductivity increases between the 3-hour and 24-hour treatment. Alloys with 1.25 to 2% beryllium, require a 5-hour heat treatment.

Where castings of special sections are used, with thin walls or complicated shapes, the treatment should be such as to avoid distortion. The following practice has been recommended.

1. Hold the castings at 1475° to 1500°F. for two hours in a non-oxidizing atmosphere. Cool in the air. (This is called "normalizing").
2. Re-heat with proper supports and quench in water.
3. Rough machine leaving enough material for a finishing grind.
4. Re-heat, properly supported, and re-quench.
5. Precipitation harden on the support or form.
6. Wet grind to a finish.

Pickling

A good pickle for beryllium copper alloys is either a 5 to 7 percent solution of nitric acid, a 10 percent

solution of sulphuric acid or a 10 percent solution of nitre cake. Pickling should be done just before the last heat treatment.

The most generally used alloy for castings contains 2.5 percent beryllium. After precipitation hardened (3 hours heating at 575 degrees F.), the properties of this alloy have been determined as follows:

Tensile strength—110,000 to 120,000 lbs. per sq. in.
Yield point—85,000 to 90,000 pounds per sq. inch.
Elongation in 2 inches—0.0 percent.
Reduction of area—1 percent.
Brinell hardness—375 to 400.
Electrical conductivity—32-35 percent of standard annealed copper.
Thermal conductivity—about the same, relative to copper, as electrical conductivity.

Applications

Beryllium copper castings have already found a number of places in industry. Some of the more important are as follows:

Bearing sleeves for airplane propellers.
Racing boat propellers.
Cams, (replacing cast iron).
Worm gears and pinions.
Corrosion-resistance to sulphur compounds.
Chilled rifle bar nuts for rock drills.
Valve parts.
Centrifugal pump parts.

Future Possibilities

Experiments are being carried on with another master alloy containing nickel as well as copper, in order to obtain a harder material. Beryllium is also being tried as a deoxidizing agent in high nickel castings.

Heat Treatment

After quenching from a temperature of 800°C (1472°F), or after cold working following such annealing, the final treatment of beryllium copper consists of holding the fabricated alloy in a furnace at between 250° and 350°C (482° to 662°F), for a definite period. With selected temperatures and compositions, the hardness of the alloy can be controlled by the length of time it remains in the furnace. Too long a treatment gradually softens the metal. It is better to treat the alloy at a lower temperature for a longer period of time than at a higher temperature for a shorter time.

Heat treatment in a salt or oil bath results in hardening in less time than in a dry atmosphere.

Beryllium copper should be fully annealed or normalized before re-rolling, re-drawing or forming into intricate shapes. Annealing consists of bringing the metal to 800°C, (1472°F) and keeping it at that temperature for 15 to 30 minutes; then immediately quenching in cold water.

Applications

A number of uses have been found for fabricated beryllium copper. To list them all would carry us beyond the space permitted, but some of the more important products are as follows:

Springs for electrical purposes and instruments.

Contact clips for cord sets and in pins and plugs on electrical appliances. Beryllium copper is especially useful here because of its resistance to the softening effects of temperatures, up to 450° F.

Wall switches, relay parts, circuit breaker parts, brush holder springs and in electrical and recording instrument springs.

PHYSICAL PROPERTIES OF BERYLLIUM COPPER

Showing the high physical values of the heat treated alloy as compared to the metal in untreated states

	JOHNSON'S ELASTIC LIMIT p. s. i.	PROPORTIONAL LIMIT p. s. i.	YOUNG'S MODULUS x 10^6	TENSILE STRENGTH p. s. i.	% ELONG. in 2"	ROCKWELL HARDNESS 100 Kg
.040" Sheet Fully Annealed	....	....	1.5% Beryllium	49,900	64.5	B 25
Same Sheet—Rolled 6 Nos. Hard	....	....	....	99,000	4.0	B 96
Same Sheet—Heat Treated after rolling 6 Nos. Hard	....	....	....	128,000	11.0	B104
			2.0% Beryllium			
.040" Sheet Fully Annealed	15,000	....	15.2	59,000	65.0	B 42.5
Same Sheet—Rolled 6 Nos. Hard	79,000	....	16.0	112,000	4.0	B100
Same Sheet—Heat Treated after rolling 6 Nos. Hard	132,000	....	17.9	176,000	2.5	B113
			2.5% Beryllium			
.063" Sheet Rolled 1½ Nos. Hard	64,000	36,000	16.3	110,000	10.0	*C 22
Same Sheet—Heat Treated after rolling 1½ Nos. Hard	116,000	62,000	19.0	196,000	3.0	*C 42

*Diamond Cone, 150 Kg. Load. Specimens too hard for the steel ball test.

Fabricated Products

The physical properties of fabricated beryllium copper in its various states, treated and untreated, are summarized in the table below.

The electrical conductivity of beryllium copper is higher than steel, phosphor bronze and other high strength materials, although it is of course, much lower than that of pure copper. It is noteworthy that the heat treatment which improves its physical properties, also increases its electrical conductivity.

In corrosion resistance, beryllium copper is about on a par with any of the wrought copper-tin alloys.

In machineability, beryllium copper compares favorably with other high strength metals. It is not free cutting but it is not difficult to machine.

Beryllium copper can be brazed, soldered or soft soldered almost as easily as pure copper. It can be welded in an induced atmosphere of hydrogen.

In appearance, beryllium copper resembles pure gold, thus giving it value as a material for jewelers.

Diaphragms, bellows, flexible and bourdon tubing.

Firing pins of firearms. Here it has been found that the life of beryllium copper in a test conducted to compare it with a high grade alloy steel was about 7 hours of continuous operation in the testing machine against 33 minutes for the high grade steel alloy.

Tools such as wrenches, chisels, hammers, scrapers, screw-drivers, etc., where it is necessary to eliminate the danger of sparking in working places where there is a fire or explosion hazard.

The information in this article was gathered from the following sources:

Beryllium Products Corporation, New York.

American Brass Company, Waterbury, Conn.

Riverside Metal Company, Riverside, Burlington County, N. J.

Beryllium-Copper Castings-Foundry Practice, Heat Treatment, Properties, By Edwin F. Cone; a paper read at the annual meeting of the American Foundrymen's Association in Chicago, Ill., June 20-23, 1933.

Electroplating Generators

By CHARLES J. SCHWARZ
Electrical Designer, St. Louis, Mo.

A Series of Articles on the "Cornerstone of the Plating Plant"* Part 7.

CONSIDERABLE misapprehension exists on the subject of brushes and brush holders which the following considerations may help to clarify.

The object of the brush is three fold:

1. To commutate the current in conjunction with the commutator.
2. To collect the commutated current.
3. To carry the collected current to the bus ring.

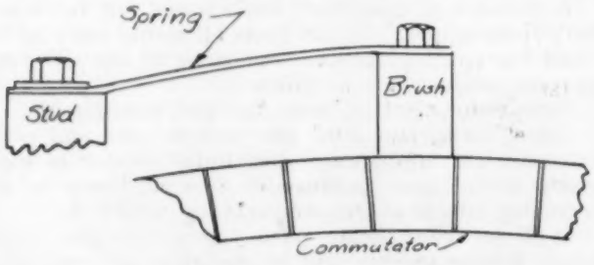


Fig. 1. Brush Holder.

The single and only function of the brush holder is to MAINTAIN THE BRUSH IN INTIMATE CONTACT WITH THE COMMUTATOR WITH A MINIMUM OF PRESSURE.

Thousands of brush holders have been invented, many patented; most depend on the regulated pressure of various types of springs but air pressure and even hydraulic pressure, centrifugal force etc. have received serious attention: from the simplest to the most elaborate, all brush holders are good that MAINTAIN THE BRUSH IN INTIMATE CONTACT WITH THE COMMUTATOR WITH A MINIMUM OF PRESSURE.

The contention that a brush holder helps the brush by relieving it of part of its current and part of its heat through contact is misleading: no dependence should be placed upon these vicarious functions in the design of the brush holder or the brush because they are at best uncertain and apt to interfere with the essential function, to MAINTAIN THE BRUSH IN INTIMATE CONTACT WITH THE COMMUTATOR WITH A MINIMUM OF PRESSURE.

Figure 1 shows a very simple and effective brush holder; its homely simplicity makes it a good target for quips; it is cheap.

To help in maintaining an intimate contact of the brush with the commutator with a minimum of pressure the commutator should present a smooth cylindrical surface to the brush and the spring tension on the latter should cause it to follow promptly the unavoidable small irregularities that may be present.

Keeping out of the spring controversy it is evident that for a given pressure per square inch of the brush on the commutator the lighter brush will respond more promptly: the thickness and the width being determined by the amount of current the brush is expected to collect, the only dimension that will increase or decrease the weight of the brush and therefore its ability to respond more or less promptly to a given pressure is its length which for that reason should be a minimum.

Figures 2, 3 and 4 show respectively three types of brushes namely; leading, trailing and radial and there

Figs. 2, 3 and 4. Three Types of Brushes: (2) Leading; (3) Trailing; (4) Radial.

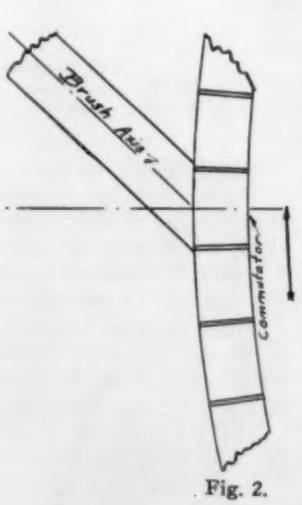


Fig. 2.

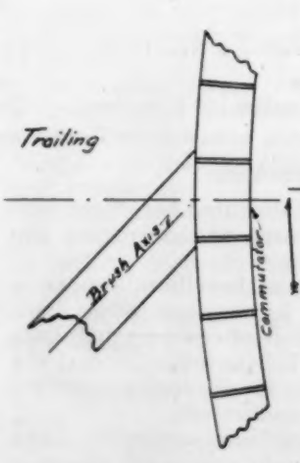


Fig. 3.

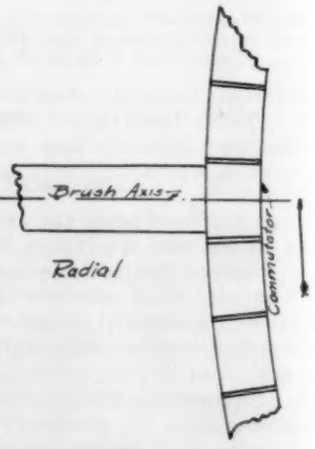


Fig. 4.

*Parts 1 to 6 were published in our issues for June, July, August, September, October and December, 1933.

is much variance of opinion which is the best type: who has not heard the honest question by a user of reaction type brush holders from a reputed expert: "Should the commutator run against the brushes or with the brushes?" and the typical answer "Of course against the brush" and just as often "Of course with the brush." The retort generally being "Well I thought it was the other way."

Many experiments have been conducted to determine the proper angle of incidence of the brush to the commutator, the results of which are perhaps a preponderance of opinion that the angle of incidence should be small: ten or twelve degrees and against the direction of rotation i.e. leading. (Fig. 5)

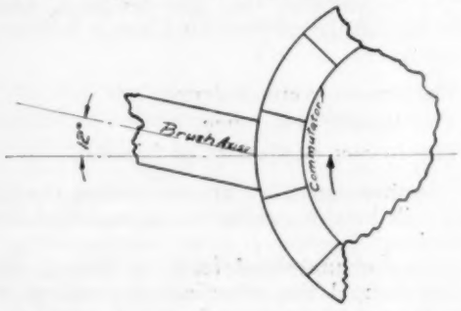


Fig. 5. Most Popular Type of Brush.

When the angle of incidence is zero the area of contact of a brush is the length of an arc, of which the brush thickness is the subtending chord, multiplied by the width of the brush, really its axial length. The difference between the arc and the subtending chord is so small that in ordinary calculations the arc is figured to be equal to the subtending chord i.e. the thickness of the brush.

When the angle of incidence increases the subtending chord also increases as shown in the following Table 1.

TABLE 1

Angle of incidence measured in degrees	Chord length measured in inches
0	1.0000
5	1.0004
10	1.0154
15	1.0353
20	1.0641
25	1.1034
30	1.1547
35	1.2208
40	1.3055
45	1.4142
50	1.5572
55	1.7434
60	2.0000

The table shows that for small angles of incidence the increase in the subtending chord and therefore in the arc of contact is small; the value increasing rapidly: thus it will be seen that a brush 0.750" in thickness will be virtually increased 1.4142 times if set at a 45 degree angle; the area of contact will be increased in the proportion of 1.0000 to 1.4142; the contact density will be decreased in proportion, with the resultant evils attending a brush too thick without the advantages of the higher conductivity which the thicker brush, set almost radially would have: clearly, setting brushes at anything but a small angle is not advisable.

The cause of chattering, when it occurs, should be sought for and eliminated without the necessity of tilting the brushes or exerting undue pressure on them.

The selection of a brush holder should have due regard to the above considerations: its type, bulk, weight and the material it is made of are of secondary importance to its prime function to MAINTAIN THE BRUSH IN INTIMATE CONTACT WITH THE COMMUTATOR WITH A MINIMUM OF PRESSURE.

The remarks made in the preceding article on the thickness of the brushes apply to radial or quasi-radial type when the arc of contact is practically that of the thickness of the brush; when the angle of incidence affects that area of contact to a marked degree the brush should be selected thinner so that its arc of contact will come close to the values given for the brush thickness.

The brushes of modern low voltage generators consist of a mixture of copper and graphite pressed into blocks submitted to various processes; these blocks are cut and ground to the desired size and shape with flexible shunts consisting of fine copper wires stranded together fastened or cemented into the brush at one end, provided with a connector at the other end for attachment to the bus ring or its appendages.

The proportion of copper and graphite varies according to the properties desired in the finished brush. A predominence of copper produces a material more or less approaching the appearance, specific gravity and conductivity of a block of pure copper whereas a predominence of graphite yields a product more or less approaching the appearance, specific gravity and conductivity of a block of pure graphite; tin and other metals are sometimes incorporated in the mixture and are supposed to give it more or less valuable properties.

As may be surmised the ultimate quality of the brush material does not depend altogether on the percent of the ingredients; the thoroughness of the mixing, compressing, heat treating, etc., are of great importance.

The data furnished by brush manufacturers lack uniformity nor is the product of the same manufacturer absolutely uniform; physical tests and chemical

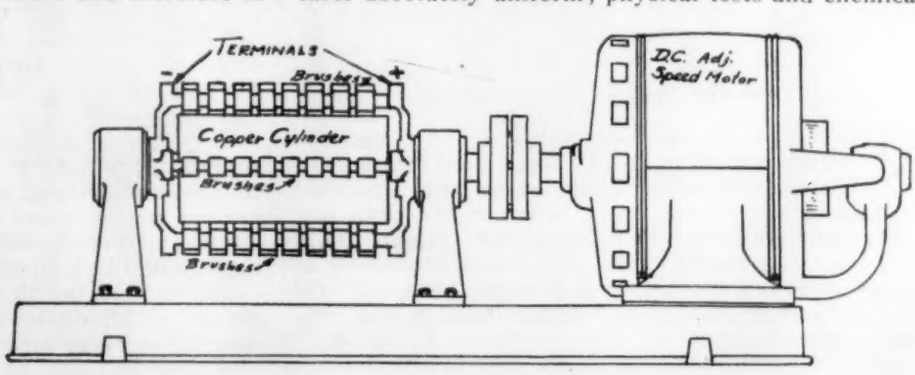


Fig. 6. Spacing of Brushes on Copper Cylinder.

analysis are insufficient to determine with accuracy the suitability of a brush.

The three properties of a brush that most concern the designers, manufacturers and users of plating generators are:

1. The brush contact drop.
2. The brush resistance.
3. The coefficient of friction.

These can be measured: the apparatus consists of a cylinder of copper mounted on a shaft free to revolve in suitable bearings driven by a direct current adjustable speed motor. Brush holders are disposed in two groups, positive and negative, in such a manner that the brushes to be tested will be suitably disposed to rub on the outer periphery of the copper cylinder. (Fig. 6)

A certain number of brushes, say fifty, are selected at random from a lot of one or two thousand, inserted in the brush holders and the free ends of their shunts clamped tight; they are seated in the usual manner by sand papering and the cylinder is revolved at a fairly high speed until the brushes' rubbing surfaces are thoroughly polished. The internal resistance of the copper cylinder between the positive and the negative groups being neglected, a current is caused to flow and that current measured in amperes; at the same time the potential difference between the point of attachments of the shunts is measured in volts. The total resistance expressed in ohms will include the resistance of the shunt, the shunt attachment, the brush resistance and the brush drop; these measurements repeated for various values of current will permit the comparison of brushes of different manufacturers and of different types of the same manufacturer. Means of segregating the brush drop proper from brush to cylinder and from cylinder to brush, of measuring the brush resistance proper, the resistance of the joint between the brush and its shunt and the resistance of the shunt proper are also provided.

Finally the brush friction at various speeds and pressures is ascertained by measuring the input to the direct current motor and again measuring the input to that same motor at the same speed with the brushes lifted.

On the assumption that the design is correct and has been faithfully carried out a brush will be selected that will have:

1. The lowest contact drop.
2. The lowest resistance.
3. The lowest coefficient of friction.

or if these three qualities are not united the data from the test will be the guides to the most advantageous combination.

When unfortunately defects in the design or its execution compel the selection of a material having no less than a definite amount of contact drop or resistance or both the data of the test will point to the brush best adapted to the case.

Next article will discuss commutator speeds, equalizers, brush holder riggings and bus terminals.

Brazing Solder

Q.—PLEASE give some information about the brass spelter solder to use in the manufacture of floor and table lamps. It comes in a powder or a liquid form, and can be put on with a brush or a stick. A blow torch is then applied.

A.—There are a number of alloys on the market that might suit your needs. We suggest that you try some of those advertised in **Metal Industry.**

To make a low melting spelter, melt yellow brass, such as used for water faucets, and zinc, using about 5 pounds of brass and 2 pounds of zinc. Reduce the resulting alloy to a fine grained condition by filing or coarse wheel wet grinding. The powdered spelter can be mixed with alcohol for brass and non-ferrous metals, or with liquid zinc chloride for brazing steel, and applied with a brush. For brazing cast iron parts, copper oxide paste is the best. Mix the pulverized oxide with water or alcohol.

We assume that the color of the brazed joints does not enter into the problem, for you are probably going to electroplate the entire lamps so as to get a uniform color over all.—W. B. F.

Acetic Acid Resistance

Q.—WE are interested in a plater's finish, that will satisfactorily withstand acetic acid fumes.

A.—A silver coating would resist the attack of the acetic acid fumes more satisfactorily than any other one metal which I might suggest. Nickel would be my second choice. Tin offers some resistance to acetic acid and its fumes and might be tried. Of the non-metallic coatings, rubber would offer the greatest promise.

It must be remembered that the resistance of these metals will vary depending upon the concentration of acetic acid if direct contact with the liquid occurs, or with the concentration of the acetic acid fumes, and with the temperature. It is not possible, therefore, for to say definitely what any one of these metals will do. But it is known that rubber is entirely satisfactory as a non-metallic material for handling acetic acid and acetic anhydride. Silver on the other hand, can be used with these materials without offering any metallic contamination so that its resistance to attack is very high.

In order to secure the maximum protection from any one of these materials the coating will have to be thick enough to insure freedom from porosity. In the case of silver, this can best be accomplished by scratch brushing and replating several times; or better by burnishing a heavy deposit.—A. K. G.

Plating Research Discontinued

We are informed that the research work carried on by the Bureau of Standards on the protective value of electroplated metal coatings on steel was discontinued as of February 1, 1934. This Research was underwritten by the American Electroplaters' Society and the work had the co-operation of the American Society for Testing Materials. The project covered the testing of 7,000 specimens plated with various metals, under a wide variety of exposure conditions, in order to obtain the data necessary for setting standards for plated coatings.

The reason for the discontinuance is the impossibility of obtaining sufficient funds at the present time for carrying on.

Hard Rubber

By D. D. WILKINS

Chemical Equipment Sales Department
American Hard Rubber Company, New York

Its Field of Application in the Plating Industry Is Almost Unlimited Because, in General, Hard Rubber Is Resistant to Most Plating Solutions

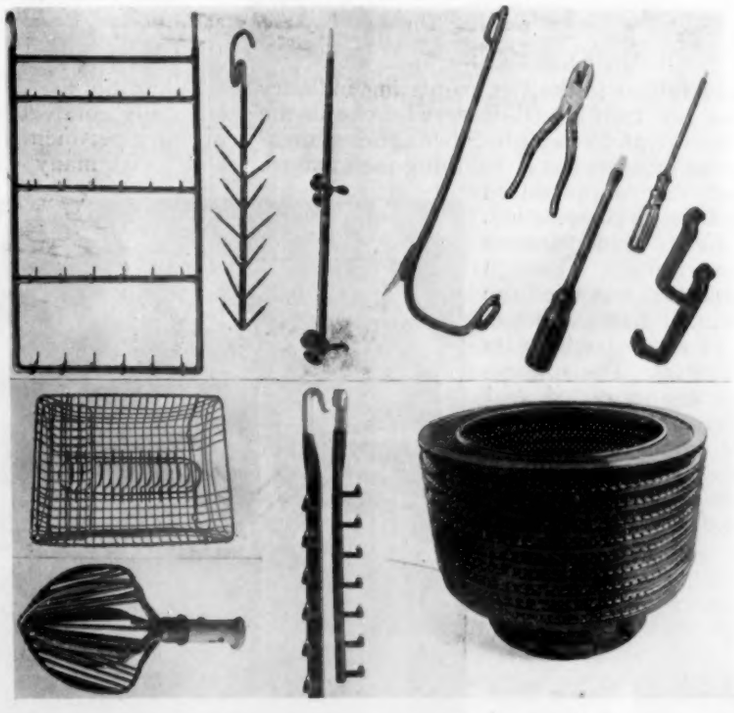
BACK in 1926 the manufacture of automatic plating equipment presented a problem to the hard rubber industry.

Prior to that time hard rubber lined and hard rubber lined and covered steel tanks had already been used in many industries over long periods of time. A hard rubber lining had been developed to the point where its inherent qualities, such as elongation and tensile strength, made the lining suitable for handling corrosion problems over a wide temperature range. An integral bond had already been established between the hard rubber and the steel which prevented the collapse of the lining or any tendency of the lining to "creep." Such linings were often cushioned between the hard rubber and the steel by a layer of soft rubber to take care of shock to a remarkable degree.

It was recognized that the properties of hard rubber were of a nature that adapted themselves in the plating industry.

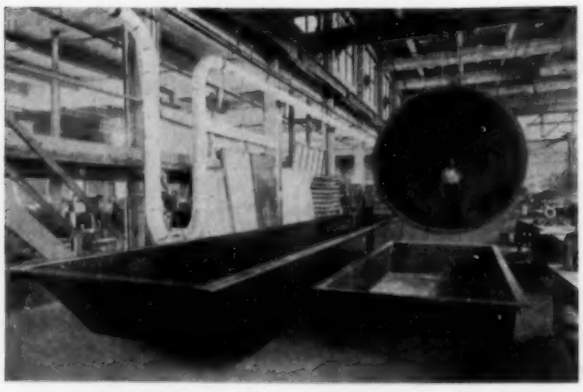
Many installations of hard rubber lined tanks have been in continuous plating service for well over five years. These tanks have given a minimum of trouble and have had little or no maintenance cost. Many large manufacturers of automatic plating equipment are prepared to offer such tanks as a part of their installation. Plating racks, too, have been covered with rubber and for many years their value has been apparent in saving of equipment and saving of electrical current which would otherwise be used to deposit metal on the rack itself. Hard rubber and rubber lined pumps, pipe and storage tanks, as well as filtering devices are used in the plating industry. There are standard hard rubber plating barrels on the market today which have proven their utility for a period of years. Hard rubber dipping baskets offer many advantages over metal or earthenware.

Hard rubber has many useful physical and mechanical properties that make it an engineering material of great value. It is non-absorbent, non-porous, an excellent insulator against the passage of electrical current and resistant to the corrosion of practically every chemical acid solution used by platers. Hard rubber is successfully bonded to metal so that rubber lined steel tanks, flue ducts, blowers, piping, etc., are of great interest to manufacturers who have to combat corrosion and the high costs that result from having equipment ruined in a comparatively short time.



Articles Covered With Rubber by the Anode Process.

An idea as to the versatility of hard rubber for the protection of equipment may be obtained from the following list of equipment that is so protected: plat-



Plating Tanks Lined With Rubber By the Anode Process.

ing barrels; shipping containers; continuous filters; fans; blowers; hoods; ducts; pumps; standard pipe and fittings; plating tanks; pickling tanks; storage tanks; vacuum tanks; crystalizers; vacuum dryers; centrifugal extractors; bleach rods and dye sticks; stock chests for paper mills; paper mill digesters; absorption towers, etc. The field of application is almost unlimited because, in general, hard rubber is resistant to all plating solutions and to all variations of such solutions with the exception of chromium plating solutions.

Many of the items mentioned in this article are protected from corrosion by the application of hard rubber by the Anode Process (electrical deposition of rubber). This process particularly is adapted for covering such articles with rubber as are of odd shape and many pieces of this character could not be covered successfully in any other manner. The deposit is very uniform over all portions of the piece but can be left off wherever the covering is not needed.

Hard rubber without inserts or steel backing is also a valuable material. Equipment of all hard rubber is available as follows: hard rubber pipe and fittings in iron pipe sizes both standard and extra heavy up to 4 and 6 inch; hard rubber utensils, dippers, pails, measures, etc.; hard rubber pumps, centrifugal, single and double acting and rotary gear types, with capacities up to 250 gallons per minute.

Rubber and Its Application to the Electro-Plating Industry

By J. F. AMLICKE

Rubber Lined Tank Department. Manhattan Rubber Manufacturing Division, Raybestos-Manhattan, Inc., Passaic, N. J.

THE use of rubber in the electro-plating industry has earned for itself a well deserved niche in the field of science and research. Since time immemorial, when it was first used as a plaything for savages, to our present day of advanced engineering and hectic competition, rubber has been a continuous source of wonderment. Through diligent research that has tried the patience of man, it has advanced, step by step, to a point where its use is now universal. The applications of rubber are so varied, and its uses so diverse that it is practically a part of our everyday humdrum existence. Undoubtedly, it has proven itself to be a very important cog in this, the Alloy Age.

While the use of rubber is of utmost importance to our daily comfort and well-being as individuals, it is of more pertinent importance to industry as a whole, and to its many various branches singly.

Acid-Proof Rubber Lined Plating Tank in Service. This Tank is Built in Flanged Sections.

Let us consider the electro-plating industry particularly. Here the use of rubber has attained unrivalled success. Its efficiency in operation has reduced production costs, it has eliminated acid corrosion of metals, it has reduced to a minimum costly replacements resulting in loss of production, and in many instances completely paralyzing operation of an entire manufacturing plant, with the resultant loss in revenue. Do we wonder then that the advent of rubber in industry has been received so wholeheartedly by the entire trade?

The uses of rubber in this branch of industry are many: Lining for tanks, such as; acid dip; electro-pickling and plating; coverings for plating racks and hooks; linings for exhaust hoods and fume ducts; protection for exhaust fans; linings for storage tanks, and for the necessary piping and fittings for the conveyance of acids and corrosive solutions.

The advantages of rubber linings in plating tanks are manifold. Primarily, rubber eliminates the corrosive action of plating and pickling solutions. Secondarily, but with equal importance, rubber linings provide tanks with an insulation which keeps the tank at all times out of the electro-chemical circuit, thereby eliminating objectionable electrical conditions which sometimes occur when lead lined or unlined steel tanks are used. A rubber lining properly compounded and vulcanized to the inner surface of a plating tank precludes the possibility of the metal tank becoming an electrode, which action always tends to upset the control of a plating bath. The use of rubber linings adds materially to the efficiency and life of the equipment, reducing to a minimum costly replacements and delays.

These same advantages apply to other equipment used in electro-plating plants. Rubber covering exposed parts of plating racks and hooks eliminates wasteful deposit on the racks themselves. Rubber acts as a protector for exhaust hoods, fume ducts, and fans, by eliminating the corrosion of metal parts due to acid fumes, thus reducing maintenance costs.

Rubber lining of storage tanks makes it possible to store large quantities of acid or corrosive solutions, which can be purchased in bulk at a considerable saving in cost, and eliminates the use of earthenware crocks or glass carboys, which require considerable handling and increase maintenance costs due to breakage. Rubber lined pipe, and valves, and fittings make it possible to convey corrosive solutions from a central storage tank to any point in the plant.

Obviously the many uses of rubber in plating operations have proved that it plays an important part in the perfection of equipment now in operation, and assuredly its use will be of prime consideration in designing equipment of the future.

The use of rubber is not limited to any one industry; its scope is much greater. Its use for protection against corrosion is but one of many varied uses.

Removing Aluminum From Tin

Q.—How can we remove the aluminum from tin-base white metal?

A.—In reference to removing aluminum from white metal mixtures of a high tin content, if the white metal contains a large percentage of aluminum it will be necessary to put the white metal through a sweating furnace, keeping the heat down to approximately 550 to 650 deg. F., and sweat all the tin and lead out and the residue put through the refining furnace, using the following flux:

Iron scale	100 lbs.
Lime	50 "
Coal dust	200 "
Silica sand	75 "
Soda ash	15 "
Fluorspar	50 "

Mix this material up well and add 20% of this flux. The iron will throw down the tin and lead and flux off, in the slag, the other impurities. If the slag shows any tin, increase the iron content. It should not be necessary to use the sweating furnace unless you find it would be more economical to do so.

On the other hand, if your white metal contains under 1% aluminum, you may remove this amount by the following method. Melt the white metal in an iron kettle and boil the metal by inserting a raw potato, or block of green wood, or an old leather shoe. Boil the metal thoroughly and cover it with barium sulphite, the trade name of which is "Barites". Let it stand for about 20 minutes and boil the metal again. Then let it stand and lower the heat about 30 minutes. Then skim off clean and cover with litharge (oxide of lead), let it stand for 30 minutes, and skim.

This process should remove the aluminum from white metal of a high tin content that contains under 1 per cent aluminum. Your iron kettle should contain at least 3,000 lbs. to do the work economically. However, the process will work in 500 lb-lots.

W. J. Reardon.

Percussion Power Presses

Q.—KINDLY let me know the features claimed for the power operated screw presses, as the advertising of this type of machinery, when advertised at all, is too meager to show the fundamentals of the design of such presses, or their field of greatest usefulness.

A.—This style of press applies pressure to the metal placed between dies, by means of a heavy power-operated screw that is driven by a balanced friction gearing. The arrangement is such that the speed of the screw increases as the ram approaches the work. This feature together with the flywheel effect of the large diameter and heavy horizontal friction wheel on the screw causes a very heavy squeeze between the dies. There is a cumulative effect from a blow and a pressing action combined, and the flow of the metal in the dies absorbs the power to a standstill. The blow is not so sudden or great as in a drop hammer, and the pressing effect is faster than that in hydraulic operation. The machine operation is relatively quiet and shockless.

A very wide range of forgings can be produced on this type of forging machine, such as cutlery, jewelry, table ware, metal novelties, embossing, stampings, etc.; also the great variety of parts as required in many of the industries that absorb forgings of both ferrous and non-ferrous metals. Either hot or cold metals can be forged by this method.

W. B. Francis.

Job Platers Complete Organization

Meeting of the Board of Governors of the Master Electro Platers' Institute in Cleveland, Ohio, January 19-20, 1934. Work on Organization; Costs, Estimates and Contracts; Fair Practices; Labor Policies

THE Master Electroplaters' Institute held a meeting of its Board of Governors on January 19 and 20, 1934, at the Cleveland Hotel, Cleveland, Ohio. About fifty men were present, representing about three hundred firms throughout the United States.

The first meeting was called to order on Friday, January 19th, at 10 A.M., by James Gerity, Jr., president. It was a general meeting for the purpose of organizing the work. Committees were appointed to work on (1) Costs, Accounting, Estimating, Contracts; (2) Organization; (3) Fair Practices; (4) Wage, Hour and Labor Policies.

One of the first duties of the organization was to choose an executive secretary and an attorney, in order to have a staff under which operations could begin at once. **Mr. Booth** of Detroit was chosen executive secretary; **Mr. Spray** of Chicago, an attorney.

One of the major jobs to be undertaken was that of writing a supplementary code under the Fabricated Metal Products Code. This was gone into without delay by the Committee assisted by **Mr. Booth, Mr. Spray** and **Mr. Hunter,** (a member of the Executive Committee of the Fabricated Metal Products Federation.)

Wage Rates

The Committee on wages and labor rates, after a thorough consideration of the data submitted to it from all over the country, found that 70 cents per hour was a fair minimum wage for polishers. (Wages throughout the country varied from 39 cents to 80 cents per hour). It was found inadvisable, however, to put this figure into the Code. Mr. Hunter pointed out that such procedure would necessitate calling in labor representatives at the hearing which would consequently be dragged out and delay the adoption of the Code for a much longer time than would otherwise be necessary. It was decided to allow the Code Authority of the Institute to set fair wages for platers and polishers in every district, of course, with the advice of the local members and the local Code Authority, if any.

It was deemed inadvisable to attempt to restrict production or expansion of facilities as such a measure would call for statistics for the past few years, proving that the industry as a whole had lost money. While this condition is generally known to have been the case, proof would be difficult to obtain due to the lack of accurate records in most plating shops.

Competition with Manufacturers

The competition of manufacturers can be controlled wherever the manufacturers do job plating as a part of their business. It will be necessary, however, to invite representatives of such manufacturers to the Code hearing and give them an opportunity to present their case. However, all manufacturers with plating departments should be forced to include in their costs the same rate for platers and polishers, as set up in their district by the Master Electroplaters' Institute for job shops. Under these circumstances, manufacturers must be represented on the Board of Governors of the Institute. They will probably have three such members, of their own selection.

Labor Relations

It was found that in some districts, the polishers are completely unionized. In many districts, however, no such arrangements exist. In Buffalo, for example, where the whole city has been unionized by agreement with the American Federation of Labor without signed contracts, by verbal agreements only. The minimum rate for polishers is set at 80 cents per hour. This arrangement has been in force for only a little over one month, but it was reported that so far it is working satisfactorily.

It was the concensus of opinion of the Governors at the meeting that the Master Electroplaters' Institute should be governed in its labor policies by the practices of the Fabricated Metals Federation.

Financing the Institute

It was decided, upon the recommendation of the Ways and Means Committee, that in order to carry on the business of the Institute actively, it would be necessary to assess each member 25 cents per 160-hour month per employee, with a maximum of $25 per month for any single shop. It was pointed out that the Institute can enforce the collection of the assessments for the Fabricated Metal Products Federation on all plating shops whether or not they are in any association. (These dues the Master Electroplaters' Institute plans to pay out of its own treasury for its own members). Whether or not the Institute can also collect its own dues from shops outside of its organization, remains to be seen.

Costs and Cost Estimating

It was decided that as a preliminary to estimating, it was necessary to specify in the contract form, the base metal to be plated and also the first cutting down operation (grade of emery to be used). These specifications are necessary in order to define clearly the amount of work that has to be done on a job. After

considerable discussion and thorough consideration of the different systems of cost estimating recommended from various sections of the country, it was judged that the best combination, for accuracy and simplicity, would be the following:

1. Total cost of all direct labor on a job.
2. Multiply this total cost by 2½.
3. This figure will be the selling price including profit.

Under "direct labor" is included all labor except office help, packing and shipping, repair mechanics and porters. In other words, direct labor covers polishers, platers, rackers, wirers, lacquerers, sprayers, finishers, inspectors and all others actually engaged in the shop operations, including the plating and polishing foremen. The foreman's time must be prorated over the different jobs.

A figure was arrived at for barrel plating cadmium. It was decided that on this class of work a fair minimum charge was 3 cents per pound.

No decision was reached for plating white nickel in barrels.

For bright plating in barrels, it was decided to add one cent per pound for each operation to the three cents per pound figure given above. So for example, a bright nickel job would call for a minimum of 5 cents per pound. These figures were based on the operation of 50-pound barrels.

No decision as to cost estimating methods was reached for the hard chromium plating industry.

It was decided that the minimum charge for any job in the plating or polishing industry should be $1.00.

Standards of quality were thoroughly discussed. It was pointed out that the salt spray test was far from conclusive. Consequently, it was decided that any specifications set should be based on the thickness of the plate, in order to avoid any difficulties caused by the varying qualities of the base metal supplied.

Credit terms were discussed and tentatively set at thirty days net or 1 per cent ten days. Extensions of credit beyond these terms were left to local organizations to arrange, according to the varying conditions which obtain.

Organization

The country was divided into twelve districts. (This may later be increased to 15). These districts are as follows:

District 1. Washington, Oregon, California, Nevada, Arizona, Utah, Wyoming, Idaho, Montana.

District 2. North Dakota, South Dakota, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, Texas.

District 3, Minnesota, Wisconsin, Iowa.

District 4. Missouri, Arkansas, Louisiana, Mississippi and the extreme western portion of Tennessee.

District 5. Kentucky, North Carolina, Couth Carolina, Georgia, Florida, Alabama, all of Tennessee except extreme western portion.

District 6. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

District 7. Greater New York, Southern portion of New York State, extending as far north as the straight line of the northern boundary of Pennsylvania and New Jersey.

District 8. Virginia, Eastern Pennsylvania, Delaware, Maryland, and District of Columbia.

District 9. Western Pennsylvania, West Virginia, Southern Ohio, including on the northern boundary the cities of Lima, Mansfield, and Canton.

District 10. Northern New York extending as far south as Kingston.

District 11. Michigan, Northern Ohio, Northeastern Indiana including the cities of Fort Wayne, Plymouth, and South Bend.

District 12. Illinois, all of Indiana excepting portion included in District 11.

Within these districts may be one or more local associations. Each one of these local associations will be entitled to a member on the Board of Governors, which consequently, will be a large body. However, all of the locals in each district will choose from among their number, one representative to sit on the Executive Committee of the national organization. Each member of the Board of Governors will have one vote, but the details of operation and carrying on of the business of the Institute will necessarily lie with the Executive Committee (twelve in number).

General power was given to the Executive Committee, which will act as the National Code Authority to settle details concerning prices, cost estimating and contracts. It will also rule as to polishers' and platers' wages.

It is expected that the Supplementary Code will be put through and in operation in about sixty days. The next meeting was set for June 1934, to be held in Detroit, about two days before the meeting of the American Electroplaters' Society.

Insulating a Furnace

Q.—WE are trying to bring out a new and improved metal feeder for type machines and are seeking the best heat resisting materials for the jacket around the crucible. The jacket may be ½" thick with a ½" flue space between it and the crucible, which has a working temperature of 550° F. Is there anything better than an outer and inner shell made of 18BS aluminum alloy the center packed with an insulator for resisting heat penetration? The outer shell must be attractive, free from oil stains and low in cost.

A.—We would think aluminum would be your best material to use for the shell as it is light and easy to handle. If your heat resisting material or insulator is good, it is immaterial what metal the shell is made of as you rely on the insulation for your heat resisting.

W. J. Reardon.

Flatware Plating

Q.—WE have been asked to quote a price on flatware with a "standard half plate with and without overlay."

We wonder if you can inform us just what is meant by "standard half plate." Also what is meant by "overlay."

We assume that standard half plate means a six pennyweight plate. Is that correct?

A.—The standard plate on flatware is 2 ozs. per gross of silver on teaspoons; 4 ozs. on tablespoons and forks. Therefore, half standard would be 1 oz. per gross; other pieces in proportion.

"Overlay" is the reinforcements by sectional plating on the back of the bowl at the point of most wear. This overlay plate should be at least three times the thickness of the all over plate to give equal length of life to the piece.

F. C. Mesle.

A Machine for Gold Beating

AN industrial art which has for centuries been carried on by hand has at last, it is stated, succumbed to the machine. A spring hammer has been developed for gold or silver beating by K. Leopold of Furth, Bayern, Germany. The American representative is F. W. Jaeger, 140 Liberty street, New York.

The spring hammer consists of an anvil, side stands and top bearing containing the main shaft and transmission gears for the cam drum.

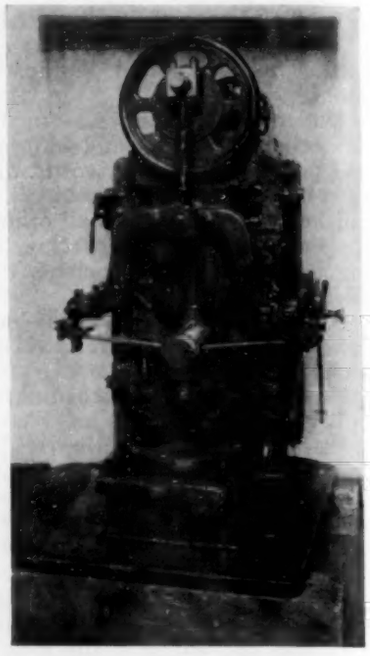
The hammer is set up on a small foundation and fastened with bolts. A plate of cork is put under the anvil to reduce the vibration to a minimum. The hammer makes 270 to 280 blows per minute, is fully automatic and disengages every ⅛ minute to prevent the forms from getting too hot. The hammer can also be arranged to disengage at longer intervals according to the thickness of the metal leak to be manufactured. The operations in making gold leaf are as follows:

The gold bars are annealed in a charcoal fire, forged to size, and then rolled to a long strip and again annealed. The strip is cut into small squares and about 700 of them filled in "pergamin" form and put under the hammer. This way of manufacturing is called "quetsche" (squeezing).

The gold leaf is then torn with a knife into four parts, and after that the leaf comes first into the form where it is hammered as thin as possible.

It is necessary to watch closely, especially when making the thin leaves, so that the forms will not get too hot. It is necessary as well as preferable to have several forms in use, so that two or three forms can cool off. This is done by putting them between cold iron plates. Also at the beginning it is necessary to watch the process very closely until the men are acquainted with it. Of course, the thinner the metal desired the more beating has to be done.

The advantage of the mechanical method is that every stroke hits the same place, which is impossible by hand. It is advisable to use two hammers for beating, one with a heavier anvil and one for finishing. After the form is put under the hammer, the form plate is pressed down to prevent the leaves from jumping out of the form.



Machine for Beating Gold Into Leaf.

A gauge on the side of the hammer permits regulation of the thickness of the leaf. For instance, if a 40 m/m leaf is intended, it is hammered down, the forms taken out, turned, hammered again and annealed. After cooling, the gauge is set to 50, etc., until the desired thickness is achieved. When approaching the thinner sizes care must be taken not to spoil the leaves through too much heat.

Platinum Solution

THERE are several different formulae for this solution, but probably the best is the one first used by Roseleur with a slight modification. In this solution the platinum has no tendency to separate out when the bath is not in use as is the case with the other types of solutions. To prepare the solution proceed as follows:

Take one ounce of platinum and dissolve it in 15 ounces of C. P. nitric acid and 10 ounces of C. P. hydrochloric acid. Place on water bath and when all the platinum is dissolved, evaporate to a thick syrupy mass. Now add water and evaporate again. The object of the evaporation is to expel the excess of acid. When cold, dilute with water to 3 quarts and add 15 fluid ozs. of 50% phosphoric acid and then add 26° ammonium hydroxide until solution smells quite strong with ammonia and the yellow precipitate of the double phosphate of platinum and ammonium will be formed.

Now dissolve fifty ozs. of sodium phosphate (secondary crystals) in 3 quarts of warm water and pour with constant stirring into the platinum solution containing the ammonia. Boil until the solution is free from the odor of ammonia and the solution has a slight acid action to blue litmus paper. The yellow solution will now become nearly colorless when same should be diluted with water to make 2 gallons and the solution is ready for use.

Use the solution at a temperature of 150 deg. to 175 deg. F. with 5 or 6 volts and platinum anodes.

As the platinum anodes are insoluble in the solution, the solution will in time become depleted when a new solution should be made and the old one sent to a refiner to recover the small amount of platinum that is left in the solution. **Oliver J. Sizelove.**

Developments in Metals and Finishes

Electrolytic Brightening Process Improves Aluminum Reflectors

DISCOVERY of a new type of reflecting surface with a base of aluminum was announced at a meeting of the Illuminating Engineering Society, held in Cleveland, Ohio, January 22, 1934. Aluminum finished by the new process has a reflectivity as high as 85 per cent—not far below that of silver. It has, it was stated, the outstanding advantage, from the commercial standpoint, of not tarnishing in industrial atmospheres, of being resistant to weather, and of being readily cleaned by washing with soap and water. Papers on the subject were read by A. B. Oday and A. F. Dickerson, of the General Electric Company, and by J. D. Edwards, Assistant Director of Research of the Aluminum Company of America, New Kensington, Pa. The discovery of the improved reflecting surface was made by Dr. R. B. Mason, of Aluminum Research Laboratories, New Kensington, Pa.

Dr. R. B. Mason of Aluminum Research Laboratories, Showing the Reflecting Qualities of a Sheet of "Alray" Treated Aluminum. On the Table Are Several "Alray" Curved Reflectors.

Aluminum has long been used for reflectors. The usual commercial practice has been to finish and brighten the surface by polishing or by etching. With polished aluminum reflectors, a reflection factor of 65 to 75 per cent has usually been obtained. The practical disadvantage of reflectors finished in either of these ways is their liability to surface staining when exposed to the weather or the difficulty of cleaning if dirt is allowed to accumulate on the reflecting surfaces.

In seeking for improved reflecting surfaces, Dr. Mason discovered a new type of anodic treatment which brightened instead of dulled the aluminum. Neither did it injure the specular characteristics of the surface. As a result of his investigations, it is now possible to take a highly polished aluminum surface and by the application of what he calls the "electrolytic brightening process", increase its reflectivity, leaving on the surface at the same time a very thin protecting oxide film. To prove his point, Dr. Mason took an aluminum reflector having a reflectivity of 74 per cent, subjected it to the electrolytic brightening process, and gave it a subsequent reflectivity of 87 per cent without any roughening of the surface.

A further fortunate advantage of the process was that a heavier protective oxide coating could be produced after the electrolytic brightening step by a second anodic process and without any substantial loss in reflectivity. This was done by means of the Alumilite process. This process, well adapted for this purpose, is a means of anodically coating aluminum in electrotypes of patented composition. The electrolytic brightening treatment appears to remove impurities from the surface of the metal. After the brightening treatment, the Alumilite process can be further employed to oxidize the surface electrolytically.

As a final step in producing a finished reflector the oxide coating is sealed by a special process to make it impervious to corrosive influences. The sealing converts a porous, moisture-adsorptive coating into an impervious non-moisture-adsorptive coating. Stains cannot mar the coating, and its general serviceability is increased, it is stated. The name "Alray" has been given to reflectors made by this process.

The weather resistance of the finish on the reflectors was exposed to the weather for more than seven months on the roof of Aluminum Research Laboratories in New Kensington, Pa. The reflector was taken in and cleaned from time to time and its reflectivity measured with the Taylor reflectometer. When originally made, the reflector had a reflectivity of 84 per cent, and at the end of seven months this value had not decreased, even though there was some slight scratching of the surface, owing to the washing off of accumulated grit during periodic cleanings.

EDITORIALS

The State of the Nation

WE are living in exciting times.

On December 15, 1933, the National Economic League addressed a petition to the President and Congress of the United States, calling for the maintenance of the national credit through a balanced budget. About a month later, the President sent a message to Congress calling for expenditures during the next two years, which would so far outstrip the national income as to increase our national debt to over $31,000,000,000—$5,000,000,000 above its all-time (war) peak and $8,000,000,000 above its present height. During the same month, he asked for power (1) to remove title to the $3,600,000,000 in gold from the Federal Reserve Banks to the Treasury; (2) to revalue the dollar at from 50 cents to 60 cents on the basis of its present gold content; (3) to reserve the profit of over $2,000,000,000 on this transaction for use as an equalization fund to steady the American dollar on the international exchange, and to support Government bonds.

These moves were followed by a sharp rise in security prices; by a fall in the price of the dollar to about 61 cents; by a flood of comment from economic authorities, but surprisingly mild disagreement from the opposition party and strong condemnation from some of the leaders of the President's own party.

There seems to be a growing feeling that the door is closing, if not actually shut, on fiat, printing press dollars. Evidence of the sustained confidence in the credit of the Government is the over-subscription by more than three times of a billion dollar issue of short-time obligations.

In the meantime, figures were made public by the National Industrial Conference Board, showing that living costs dropped 6/10 of 1 per cent in December, following a drop of 3/10 of 1 per cent in November.

The New York Times Business Index, after rising for five successive weeks in November and December, fell for the next two weeks, (ending January 13th) and rose again for the week ending January 20th to the figure 77 (against 67.2 for the week ending January 21, 1933).

To our simple minds there has never been a more diverse and contradictory succession of so-called causes and effects. Let those who were bold enough to prophesy beforehand, explain them. We give it up.

After the Code is Signed

INDUSTRY now has about 200 approved Codes. The metal industries have several at this writing—Fabricated Metal Products and Metal Coating and Finishing; Copper and Brass Mill Products; the Non-Ferrous Foundry; Ingot Metals; Silverware Manufacture; and several others about to be signed. Soon we shall be completely covered.

And when all the codes have been accepted the question arises, "What next?" To be sure we have set standards of fair practice. We have prohibited unfair practices, specifically, naming and describing every one. We have set fair wages and in some cases, prices. But the battle is not over. It has only begun.

The first and most important task is enforcement. Every provision of a Code must be lived up to by every member of its industry. The price-cutter, the wage-cutter and the "chiseller" strike directly or indirectly at every other member of the trade. If force is necessary, it must be used to the fullest extent to protect the honest men who are "doing their part."

The next, (and not so far behind) job is efficient operation. Reduced hours, higher wage rates and increased prices of supplies have raised costs. Prices must follow up but as little as possible. There still is, and will continue to be, competition. There is only one way to protect profits, and that is by the best equipment, kept in the best condition, the best shop layout and the best practice.

The N.R.A. started as a two-year experiment. Now we have been told (and we are not surprised) that it will not be dropped. Perhaps much of it will be permanent as Gerard Swope suggests. We must be guided by the majority of public opinion which is decisive. Codes, as approved, must be enforced and operation must be made efficient.

Silver

THE proclamation of the President on December 21, 1933, announcing a silver buying program for 1934, carries us back to the ill-fated Economic Conference in London, during the summer of 1933. At that Conference, on July 20, the representatives of sixty-six governments unanimously adopted a resolution which provided that those governments would abstain from the policy and practice of debasing or demonetizing

their silver coins; that paper currency of small denominations would be replaced by silver coinage insofar as practicable, and that legislation, detrimental to silver, would not be enacted. On July 22nd, a four-year silver control agreement was signed by the representatives of the United States, Mexico, Canada, Australia and Peru, as producers, and India, China and Spain, as holders of silver. The inauguration of the silver-buying program by the United States was a ratification by us of the above detailed understandings.

Since the Government's program applies only to newly mined American metal, the price of 64½ cents per ounce net is not the open market figure. To be sure silver rose with the announcement and is still rising, but it is still selling under 45 cents. Moreover, since the silver-using industries can use silver electrolytically reclaimed from secondary metal, they have not been affected by the Government's program, except of course, for the incidental rise in price which has taken place.

Peering into the future, probably the best informed opinion is that of Handy and Harman, who state in their annual review of the silver market: "A substantial rise in the world price of silver is dependent upon the resumption of large importations of the metal by India and China; and their ability to buy is contingent upon an improvement in economic conditions which will permit them to sell their products in the world markets at prices and in volume sufficient to create credit balances abroad."

Transportation and Metals

IT is an interesting fact that transportation—one of our oldest industries—is at the same time the one undergoing the greatest changes; also that it offers a very fertile field for new metals and alloys.

We have seen so many revolutionary changes in the youngest branch of this industry—flying—that we are no longer surprised at anything. All-metal planes and airships made largely of metal are no longer news. Automobiles and trucks with special, light chassis and bodies are no longer a novelty. But here is a new development. Among the outstanding plans of the United States Department of Commerce for 1934, is the proposed production of inexpensive airplanes to sell for $800 each or less. The Department is carrying on the experimental and advisory work necessary to make this production possible, and the project should provide important stimulation to metals.

Rapid development in these fields is not surprising. They are comparatively young. But during the past few years the venerable and reputedly "dying" member of the transportation family—railroads—have taken a new lease on life. New car and train designs are appearing, streamlined to minimize wind resistance, operating at speeds over 100 miles an hour, using large proportions of light metals to cut deadweight and increase the "pay" load; with more beautiful and comfortable interiors to add to the pleasure of the rider.

Transportation is still one of the largest users of metals and metal finishes. Copper, brass, bronze, zinc, tin, lead, and their alloys, decorative plates of all kind, pecial finishes, rust-protection and anodic oxidation—all of these materials and processes are employed in the transportation industry in all its branches. And it is important to remember that not the least or the worst of their customers, are the railroads.

Design as a Sales Factor

SINCE the advent of concerted efforts throughout industry and business to remove price as a sales factor, design has become one of the most important elements. The public has been educated to a sense of discrimination in form and color, and if they are not to be appealed to on the basis of price, there must be another outstanding sales appeal.

With so many selling the same article, with all of them fully aware of the latest developments in labor-saving machinery, with all of the competitors paying the same for labor and other costs, they must bid for the consumer on the basis of service, quality—and appearance. What is it that determines appearance? The design and the type of finish.

The artist has assumed a new importance in industry. He can design the most commonplace, the most utilitarian objects so that they will be attractive, without sacrificing their utility. It costs no more to manufacture handsome products than it does to make ugly things, and industry is awakening to that fact.

It is fortunate for the metal and plating industries that appearance depends to a great extent on the use of non-ferrous metals and the plated, polished and colored finishes. There is no doubt that these industries will benefit by the continued improvement in the appearance of manufactured products.

Plating Research Discontinued

IT was with the deepest regret that we received the announcement that work was stopped on February 1st, 1934, on the research into the protective value of electroplated coatings on steel at the Bureau of Standards. This research, sponsored by the American Electroplaters' Society and carried on by the Bureau of Standards with the co-operation of the American Society for Testing Materials, had been in progress since early in 1932. The purpose was the gaining of sufficient definite information for setting up standard specifications. The reason for discontinuing the work was lack of funds.

There is not much to be said. Everyone knows how vital standards are and how valuable they would be to the plating industry. The cessation of this research stops work on one of the industry's greatest needs. We can only hope that the break is temporary; that the work is not stopped, but only delayed; that funds will be available soon, and that the project will be revived. The electroplating industry must have standards.

Correspondence and Discussion

Polishing Piano Pedals

To the Editor of **Metal Industry:**

On page 22, January, 1934, under Correspondence and Discussion, in my letter on "The Dilemma of the Plating Industry," it is stated that iron piano pedals were plated to take a 120 emery grease wheel and still had to have enough brass plate left to take a buffing from a 14-inch sewed wheel. This should read that those pedals were roughed out on a 70 emery canvas wheel, then grease wheeled on a 120 emery wheel, then brass plated in brass solution, and buffed on a 14-inch sewed buff to color for finish. Therefore, it had to have a heavy deposit in order to stand the buffing. This was done and it looked fairly well. But why the heavy deposit when buffing half of it off? If the polishing were done properly you would have a good article.

Syracuse, N. Y. **P. C. Kramarcik.**

Electric Soldering of Jewelry

To the Editor of **Metal Industry:**

In looking through the December copy of the **Metal Industry, page** 414, I noted the answer to a question on the electric soldering of jewelry. When anyone speaks of this matter it brings to my mind something altogether different from that described in the answer. There is a process which is being used in a number of places and which goes under the name of electric soldering in which the parts of the article to be soldered are brought together in a machine similar in many respects to a small spot welding machine. The principal difference being that in this process wire solder is applied by means of a pencil. This makes a quick and neat soldered joint. The machine is not expensive, although special jigs are required to hold each type of article that is to be soldered.

Louis Weisberg,

New York. Weisberg & Greenwald.

Depositing Beryllium or Aluminum Bronze

To the Editor of **Metal Industry:**

Thank you kindly for your letter of November 20th advising us that so far there is no method of electroplating either beryllium copper or aluminum bronze over steel or brass.

If it is possible to ask some of your reader subscribers whether or not this is possible, we would appreciate your putting the question in your next convenient issue of the **Metal Industry.**

L. W. Shastock Company.

Cleveland, Ohio.

Prevention of Silicosis

To the Editor of **Metal Industry:**

On page 400 of the December, 1933, issue of your valued journal is a note referring to a report in the daily press in connection with work done by Dr. F. G. Banting on the problem of silicosis. The last sentence reads:

"It was developed under the auspices of the Industrial Hygiene Division, Ontario Department of Health, Toronto, Ont., Canada."

It is unfortunate that this should have appeared, since, of course, Dr. Banting's work is entirely independent of the Ontario Department of Health. This does not minimize in the least the interest the Department has in any work directed to the better control of this problem.

J. G. Cunningham, M. B., Director,
Industrial Hygiene Division,
Ontario Department of Health.

Toronto, Ontario, Canada.

New Books

Standards and Specifications for Metals and Metal Products. Bureau of Standards Miscellaneous. Publication No. 120. 1350 pages. Obtainable from the Superintendent of Documents, price $3.00, (foreign, $4.00).

All available nationally recognized specifications embraced within the numerical classification 600 to 699 in the Bureau's Directory of Commodity Specifications (Miscellaneous Publication No. 130) are reproduced in convenient form with an adequate index, so that specifications covering any given commodity can be easily located. There are ten chapters, covering iron and steel; iron and steel manufactures; ferro-alloying ores, metals, and metal manufacturers; aluminum, antimony, bismuth, cadimum, and cobalt; copper, brass, and bronze; lead, mercury, and nickel; precious metals, metal jewelry, and plated ware; clocks, watches, and dials; tin and zinc; and miscellaneous ores, metals, alloys, and metal manufactures.

Included in the volume are over 1,600 standards and specifications, given either in full or by suitable abstract, tabulation, or cross reference; descriptions of methods of testing, chemical analyses, metallic coatings, and heat treatment; 1,100 illustrations, to supplement the text; 2,000 cross references to demonstrate the close relationship among the specifications assigned to the metals; condensed information in the form of 1,700 tables; and a list of technical societies, trade associations, and other organizations issuing standards and specifications, with addresses to indicate proper sources for information on possible revisions or supplemental data.

National Metals Handbook. American Society for Steel Treating. Size 4½ x 7; 1453 pages. Price $10.00.

This handbook recognized as the most authoritative compilation of its kind, is now in its third edition. A large portion of it is, of course, concerned with iron and steel, but the non-ferrous section comprises 92 articles and approximately 500 pages. Each article is written or compiled by recognized authorities in the non-ferrous field. The subjects covered, to list them briefly, include aluminum and aluminum alloys including die castings; various brass foundry alloys, largely copper base; lead and lead alloys; magnesium alloys; nickel alloys; tin alloys; zinc alloys, and the precious and rare metals, including gold, platinum, palladium, etc.

Articles are also devoted to temperature measurements, etching for metallographic examination and a glossary of x-ray terms.

The book is without question an indispensable part of the library of every metallurgist.

Transactions of the American Foundrymen's Association. Volume XL, 1930, published by the American Foundrymen's Association, 222 W. Adams Street, Chicago, Ill. Size 6 x 9; 556 pages. Price to members, $2.

This is the annual volme including the reports of the meetings in 1932, the transactions of the Board of Directors, and the papers presented at the general annual meeting. A number of these papers are from the non-ferrous division, including work on red brass, nickel bronzes, materials handling in the small brass foundry, aluminum alloy castings and the design of brass and bronze castings.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

Copper and Nickel Data

Q.—We are sending you samples of our copper and nickel plating solutions which we would like to have analyzed.

The bulk of our work is the plating of steel staples. Our voltage is 7, amperage about 225, temperature 110 to 120. The color varies from day to day. Is it possible to control this more closely? Should we analyze the solution here, and how often would you recommend?

Hypo is used as a brightener in very small quantities. Caustic soda is used to prevent spots and black streaks. The work has to be run 40 to 45 minutes. We used to do it in 30. No doubt the solution was stronger. The plater often adds a little copper cyanide. We never used to add any except when making up the solution. Should not all of the copper come from the anodes? Is it possible to have too many anodes?

On the nickel solution the pH we find is a little low, but still we get good results. From the samples which we are sending along with the bottle of solution, would you recommend ball burnishing? On our work, would there be any advantage in cadmium or copper plating before nickel plating? In case the nickel content goes down quickly, should we add more nickel anodes?

One of our customers has some 5" rings made of ¼" wire which were nickel plated and have since rusted in spots. What is the best method of treating and replating? Should they be plated in a barrel?

A.—Analysis of nickel solution:

Metallic nickel	3.10 ozs.
Chlorides	0.92 oz.
pH	5.4

The chloride content and the pH are too low. Add 2 ounces of sodium chloride and 2 cubic centimeters of 26° ammonia to each gallon of solution.

Analysis of cyanide copper solution:

Metallic copper	1.33 oz.
Free cyanide	0.66 oz.
Carbonates	10.62 ozs.

This solution is in a very poor condition and we would suggest that you discard it and make a new one. In making a new solution use the following formula:

Copper cyanide	5 oz.
Sodium cyanide	6½ oz.
Carbonate soda	2 oz.
Hyposulphite soda	6¼ oz.
Water	1 gallon

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all items if possible.

Date.....

Name and address: .....**Employed by:** .....

Kind of solution: .....**Volume used:** .....

Tank length: .....**width:** .....**Solution depth:** .....

Anode surface, sq. ft.:.....**Cathode surface, sq. ft:** .....

Distance between anode and cathode: .....**Kind of anodes:** .....

Class of work being plated: .....**Original formula of solution:**.....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible.

Use separate sheet if necessary. _____

_____

_____

_____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY. 116 John Street, New York City.

A little cyanide and a very small quantity of hyposulphite of soda should be added when necessary. Do not add any caustic soda to the solution. If the metal content of the solution is not maintained from the anodes, it will be necessary to add copper cyanide.

We recommend that both of your solutions be analyzed at least once a month to produce uniform results.

If the samples were steel ball burnished before nickel plating, and also after nickel plating, the finish produced would be much better than that on the samples submitted. We can see no advantage in copper plating before nickel plating on this class of work, and we would not recommend that the work be cadmium plated before nickel plating.

Plenty of anodes should be used in both the copper and nickel solutions. The metal content should not decrease rapidly in either solution. When you have added the sodium chloride (common table salt) to the copper solution, better anode corrosion will be obtained, and this will help to maintain the metal content.

It is quite difficult to strip the nickel from the iron rings without doing some harm to the surface of the iron. We would suggest that the nickel be stripped by using a dip made of 2 parts of sulfuric and 1 part of nitric acid. After stripping the steel, ball burnish, nickel plate in barrel, and steel ball burnish.

O. J. S., Problem 5,266.

Black on Aluminum

Q.—Kindly inform us of a plating solution that will put a jet black on aluminum. If there are several solutions, please let us know which you recommend.

A.—Aluminum can be plated black by using a black nickel solution. This finish must be lacquered for protection. Formula for black nickel:

Double nickel salts	8 oz.
Sodium sulphocyanide	2 oz.
Zinc sulfate	1 oz.
Water	1 gallon

Use 1 volt pressure and maintain pH 6. If a small quantity of copper cyanide is dissolved in sodium cyanide and added to the solution it intensifies the black color.

The Alumilite process can be used to produce different colors upon aluminum. This is a controlled process, and for further information write us for the name of the company that controls it.

O. J. S., Problem 5,267.

Nickel Peels

Q.—We have been experiencing a peculiar difficulty with chromium plated link switches like the one we are enclosing. You will note that the plate on part of the switch is peeling badly, while some parts are in good condition. All parts of the switch are made of brass, except one which is made of cold rolled steel. When these parts come to us from the plating department they show no signs of peeling. The switches in question were shipped to our New York storeroom about three months ago. They were returned to us a few days ago with one part badly peeled. This is the second time this has happened on the same parts.

A.—After thoroughly examining the sample sent, we are of the opinion that the trouble is due to faulty cleaning or nickel plating; probably a combination of both.

The pieces that have peeled were undoubtedly plated when one of the above conditions existed. When the surface of the metal is not thoroughly clean, or the nickel deposit is too hard, the trouble that you are having will appear some time after plating; it may be one day or it may be six months until the trouble occurs.

A close control over both the cleaning methods and the nickel plating practice are recommended to prevent the trouble.

O. J. S., Problem 5,268.

Generators

Q.—Will you kindly give us your advice as to the proper voltage to be used for barrel plating of very small metal articles. This plating includes nickel, brass, copper and cadmium. We have been using 6 volts, but as we may be in the market for a new generator set we are wondering whether it is best for us to plate with a higher voltage than 6 volts, and for that reason obtain a 12 volt generator set instead of a 6 volt.

A.—We suggest that you purchase a three pole generator, and then you will be able to use from 6 to 12 volts. With a 6 volt generator sufficient voltage would be obtained for nickel or copper barrel plating, but 8 to 10 volts are generally used in brass barrel plating.

Tank rheostats should be used to control the amount of voltage that is required for plating varying quantities of work.

O. J. S., Problem 5,269.

Watching Colors

Q.—We are mailing you two plates. One is iron and the other is white metal nickel plated, with a black lacquer relieved on top. We are trying to match the iron base, but so far have been unsuccessful, and are wondering whether you could tell us just what plating or metal will match this iron sample.

We have tried the plain white metal, but this does not give us the desired effect either.

A.—The procedure that is generally used to produce the finish on samples submitted is to cadmium plate the iron and then plate in an arsenic black solution, after which the highlights are relieved by using a rag or sheepskin wheel coated with glue and No. 150 or 120 emery. The wheel is used dry.

The work is then dipped in a solution of varnish thinned with a lacquer thinner to proper consistency and allowed to dry. Formula for arsenic solution:

White arsenic	8 oz.
Caustic soda	8 oz.
Sodium cyanide	2 oz.
Water	1 gallon

Use steel anodes with 1 volt pressure. When the solution is first prepared, better results will be obtained if a small quantity of zinc and copper cyanide is added to the solution, so it is customary to add a pint or so of a brass plating solution to each gallon of the solution prepared.

O. J. S., Problem 5,270.

Silver on Lead

Q.—We are forwarding a sample of a certain finish we wish to get on antimonial lead. We are not having trouble with the bright finish, but we cannot get the satin finish. You will note it is silver plated and lacquered.

A.—The silver finish on the sample submitted has been produced as follows:

The work is polished, colored, and then cleaned in an alkaline cleaning solution; plated in a cyanide copper solution for five minutes; nickel plated for ten minutes; plated in silver strike solution for 30 to 45 seconds; and then silver plated for 45 minutes until a fairly good deposit of silver is produced.

The work is then brushed with a steel crimped wire wheel and a small amount of FF pumice stone moistened with water. The wheel should be 4 inches in diameter and contain 4 or 6 rows of .003" crimped steel wire. The speed of the wheel should not be over 1000 R.P.M. If the wheel is new and too much pumice is used the finish will be too gray, and if so scratchbrush wet and very lightly a second time without using any pumice. Finally coat with a good grade of silver lacquer.

With a little experimenting you should have no trouble in duplicating the finish. O. J. S., Problem 5,271.

Patents

A Review of Current United States Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,924,729. August 29, 1933. **Aluminum Alloy.** Ludwig J. Weber, New Kensington, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

1,924,876. August 29, 1933. **Coating Refractories With Metal.** John D. Morgan, Maplewood, N. J., assignor to Doherty Research Company, New York, N. Y.

1,925,339. September 5, 1933. **Electrodeposition of Metals.** Oliver C. Ralston and Morris G. Fowler, Clarkdale, Ariz., assignors to United Verde Copper Company, Clarkdale, Ariz.

1,925,687. September 5, 1933. **Process for Treating Nonferrous Metals and Alloys.** Ralph F. Cohn, Dixon, Ill.

1,925,688. September 5, 1933. **Process of Refining Nonferrous Alloys.** Ralph F. Cohn, Dixon, Ill.

1,925,896. September 5, 1933. **Method and Mill for Rolling Metal.** James R. Coe, Waterbury, Conn., assignor to The American Brass Company, Waterbury, Conn.

1,925,978. September 5, 1933. **Alloy and Article Composed of Same.** Hugh S. Cooper, Cleveland, Ohio, assignor to Kemet Laboratories Company, Inc., a corporation of New York.

1,926,057. September 12, 1933. **Working Aluminum-Magnesium Alloy.** Joseph A. Nock, Tarentum, and Edgar Hutton Dix, Jr., Oakmont, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

1,926,205. September 12, 1933. **Automatic Rod Feeding Apparatus.** George R. Leggett and Albert C. Lusher, Waterbury, and Nathaniel A. Cornell, Cheshire, Conn., assignors to Scovill Manufacturing Company, Waterbury, Conn., a corporation of Connecticut.

1,926,213. September 12, 1933. **Resistance Wire.** Jean Piccard, Lower Berkshire Valley, N. J., assignor to Hercules Powder Company, Wilmington, Del.

1,926,524. September 12, 1933. **Adhesion of Rubber Coatings to Aluminum.** Francis Gabor, Edward Csutoras, and George Laszlo, Budapest, Hungary, assignors to Anode Rubber Company Limited, a company of Guernsey.

1,926,545. September 12, 1933. **Lead Cable Sheath Containing Lithium.** Ernst Koch, Frankfort-on-the-Main, Germany, assignor to Maywood Chemical Works, Maywood, N. J.

1,926,573. September 12, 1933. **Casting Method and Apparatus.** Dudley Wilcox, Lawrenceville, N. J., assignor to Ajax Electrothermic Corporation, Ajax Park, N. J.

1,926,853-4. September 12, 1933. **Solder.** Conral C. Callis and Ralph B. Derr, Oakmont, Pa., assignors to aluminum Company of America, Pittsburgh, Pa.

Do Our Readers Want Patent Information?

A QUESTION has arisen as to the advisability of our continuing to publish patent abstracts in every issue of our journal. The number of patents being granted in the metal and metal finishing industries has grown very large in recent years. It is practically impossible to distinguish between the patents which have commercial possibilities and those which are likely to fall by the wayside. Inevitably the publication of all patents in our industries must include a large proportion of "chaff".

For that reason we ask our readers to advise us on the questionnaire below whether or not they wish us to continue to publish abstracts as we have been doing for many years. Please check one of the questions below and return the slip to **Metal Industry,** 116 John Street, New York.

1. We make use of your patent abstract page and would like to have it continued.

2. We are not interested in your patent abstract page.

1,926,855. September 12, 1933. **Solder.** Edward J. Kratz, Springdale, and Conral C. Callis, Oakmont, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

1,926,870. September, 12, 1933. **Multiple Mold.** Marius Guyot, Cleveland, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa.

1,927,052. September 12, 1933. **Aluminum Solder.** Frederick Seymour Smith, Barrie, Ontario, Canada, assignor of one-half to Jesse Webster Barrie, Ontario, Canada.

1,927,116. September 12, 1933. **Electrochemical Process.** Colin G. Fink, New York, N. Y., and Thomas H. Wilber, Bridgeport, Conn., assignors to The Bullard Company, a corporation of Connecticut.

1,927,162. September 12, 1933. **Electroplating.** Marcell Fiedler, Highland Park, and Hubert Pessl, New Brunswick, N. J., assignors to Research Corporation, New York, N. Y.

1,927,355. September 12, 1933. **Flux for Use in Soldering Metals.** Charles Harold Aston, Christchurch, New Zealand.

1,927,384. September 12, 1933. **Casting Machine.** Ernst Bauer, Niagara Falls, N. Y., assignor to USL Battery Corporation, Niagara Falls, N. Y.

1,927,626. September 19, 1933. **Metallic Material.** William G. Calkins, Detroit, Mich., assignor to Chrysler Corporation, Detroit, Mich.

1,927,671. September 19, 1933. **Method for Treating Copper Alloys.** Yuichiro Shiraishi, Tokyo, Japan, assignor to General Electric Company, a corporation of New York.

1,927,772. September 19, 1933. **Electroplating Aluminum Etc., on Copper, Etc.** Joseph Frederick Chittum, La Fayette, Ind., assignor to Purdue Research Foundation, La Fayette, Ind.

1,927,773. September 19, 1933. **Electroplating Chromium, Etc., on Iron, Etc.** Joseph Frederick Chittum, La Fayette, Ind., assignor to Purdue Research Foundation, La Fayette, Ind.

1,927,862. September 26, 1933. **Buffing Wheel.** Harry Zimmerman, Toronto, Ontario, Canada, assignor to Beulah Belle Zimmerman, Toronto, Ontario, Canada.

1,927,945. September 26, 1933. **Corrosion-Resistant Age-Hardenable Aluminum Composite Metal.** Karl Leo Meissner, Duren, Germany.

1,928,053-4. September 26, 1933. **Die Cast Zinc Base Alloy Product.** John R. Freeman, Jr., Waterbury, Conn., assignor to The American Brass Company, Waterbury, Conn.

1,928,284. September 26, 1933. **Process of Electrodepositing Chromium.** Colin G. Fink, New York, N. Y., and Hugh David McLeese, Detroit, Mich.

1,928,409. September 26, 1933. **Furnace for and Method of Continuously Annealing Strip Metal.** James R. Coe, Waterbury, Conn., assignor to The American Brass Company, Waterbury, Conn.

1,928,425. September 26, 1933. **Apparatus for Metallizing by the Melting and Projection of Metals.** Marie Claude Roger Hedde, Paris, France, assignor to the firm La Societe dite: Societe Nouvelle de Metallisation, Paris, France.

1,928,429. September 26, 1933. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York, N. Y.

1,928,641. October 3, 1933. **Aluminum Manganese Alloy.** Theodore W. Bossert, New Kensington, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

1,928,747. October 3, 1933. **Non-Ferrous Alloy.** Edmund Merriman Wise, Cincinnati, Ohio, assignor, by mesne assignments, to The International Nickel Company, Inc., New York, N. Y.

Equipment

New and Useful Devices, Metals, Machinery and Supplies

New Lacquers

The Roxalin Flexible Lacquer Company, 36-40 36th Street, L. I. City, N. Y., has developed a number of new lacquers with special applications to a wide variety of products. A summary of the properties and uses of these lacquers is given below.

Special Ten Pin Lacquer. Made for use on hard maple wood rolling pins. Gives a smooth finish, it is stated, which will withstand the abuse to which the pins are subjected; also that the coating will not pick up dirt.

Outdoor Flexible Enamels. A two-coat schedule consisting of a lacquer primer and a lacquer top coat which, when applied on metal and wood has, it is claimed, unusual outdoor exposure resistance. Under accelerated weathering conditions and also in Florida exposure the finish remained flexible. Adaptable also for wood finish.

This schedule is recommended especially for bathroom fixtures because, it is stated, of its high resistance to humidity, and its freedom from yellowing in use.

Fume-Proof White. A white finish designed to stand up against the fumes which occur in molding phenol-aldehyde plastic products as well as phenolic insulating varnishes. This finish was developed to replace the ordinary white finish which was found to dicolor very badly and to change to a deep amber.

Non-Reflecting Camera Black. A non-reflecting black enamel for camera interiors and shadow instruments. It can be applied to metal strips which are later blanked and formed into intricate shapes.

Soap Resisting Enamel. A synthetic baking material recommended for application on zinc and aluminum die castings. After baking at 300° F. for one hour, it is stated that that finish will resist immersion in soap and water for 24 hours. It is recommended for kitchen utensils.

Dial Finishing White for Zinc. A single coat white enamel for zinc sheets which can be applied by a roller coating machine or a spray. It is recommended for clock cases, gas pumps, automobile dash board dials, etc., because it is stated, of its freedom from yellowing.

Chromium Resisting Enamel for Etched Name Plates. A lacquer enamel for the etched plate industry. It can be applied on the etch plates, removed from the highlights with resist, and subsequently chromium plated and buffed to a high lustre or hard enamel appearing finish.

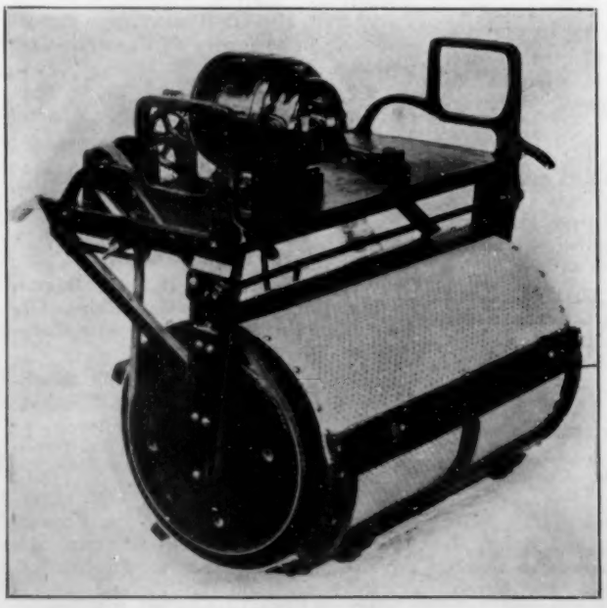
Flexible Lacquer Enamels for Strip Zinc Coating. Applied by a coating machine or spray on thin gauge pure zinc. It is stated that this material has excellent adhesion and will stand slitting and forming, such as for example, the operations in the manufacture of shoe lace tips.

New Portable Plating Barrel

A new portable plating barrel called the "Reliance" has been developed by Chas. F. L'Hommedieu and Sons Company, 4521 Ogden Avenue, Chicago, Ill., covered by patent No. 1,790,289.

The barrel is designed for use in the regular still tanks. It is light enough for one man to carry from one tank to another even when fully loaded. The motor and barrel are mounted together in a single unit. No wiring, belting or separate tanks are required. It can be suspended on the rods of a regular tank not less than 14" wide, 10" deep, and 24" long. Larger tanks may accomodate several units. The size of the barrel is 10" by 18", with a capacity of one peck of light stampings or about 30 pounds of screw machine products. The walls are made of acid and alkali resisting materials. Contacts, current capacity, etc., are supplied to order. No metals are in contact with the current in the solution except the contacts which are necessary and they can be easily removed and replaced. The barrel is recommended for acid copper, acid zinc, nickel, black nickel, silver, gold, cyanide, copper, cyanide zinc, cadmium, brass and bronze solutions.

The latest improvement announced is the use of a rubber cylinder which can be washed and used for different solutions.



"Reliance" Portable Plating Barrel. This Equipment Is Light Enough to Move from Tank to Tank, in Plating Small Work Requiring a Variety of Finishes.

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

Grinding Equipment. Five new grinding machines and the "Nortonizer", an electrical device for automatic sizing of work while grinding. The five new machines are: motorized tool and cutter grinder; small hydraulic surface grinder with automatic cross feed; new line of cylindrical grinders; new crankpin grinder; "Cam-O-Matic", a highly specialized tool for grinding automotive crankshafts. Norton Company, Worcester, Mass.

Portable Current Transformers, for use with indicating and recording instruments; 10 to 800 amperes capacity; aluminum containing cases, finished in baked enamel and nickel plate; moistureless; weighs 28 lbs.; used in all kinds of portable testing. Esterline-Abgus Company, Indianapolis, Ind.

Roll Feeding Straightener. Takes metal from coil, flattens it, and delivers it to blanking presses or other machines, climinating necessity of using flat strip metal to make flat blanks. Illustrated circular available. Waterbury Farrel Foundry and Machine Company, Waterbury, Conn.

Speed of Plating Conveyor Controlled by Variable Speed Transmission

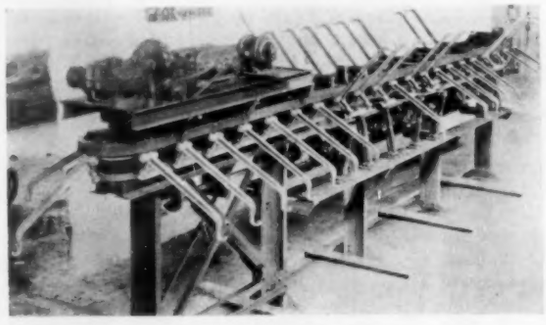
By FRANCIS A. WESTBROOK

Mechanical Engineer

The illustration here shows a Meaker processing conveyor equipped with a Reeves variable speed transmission for variations in plating speeds according to the requirements of different specifications. That is, in order to obtain maximum production under varying specifications it is necessary to vary the speed of the conveyor accordingly, and in order to obtain uniformity it is equally necessary to have accurate speed control.

a 4:1 range, a roller chain drive connects with a countershaft type speed reducer from which power is transmitted to the conveyor. By means of this hook-up a speed variation of 200:1 is possible. Such a variable speed transmission unit may be applied to any conveyor requiring such control, even if it is not a part of the standard equipment.

This conveyor travels in a horizontal loop with carrying arms mounted on the conveyor chain. The product to be plated



Left — Meaker Plating Conveyor Equipped with Reeves Variable Speed Control.

Right — New Newton Jr. Melting Pot for Solder and Other Metals.

With the unit shown in the illustration the constant speed shaft of the transmission is driven at 900 r.p.m. from the ½ hp. constant speed motor. From the variable speed shaft, controlled over

is suspended from these arms and is immersed in the washing, rinsing and plating tanks as required by raising or lowering the arms. The illustration shows the machine with the tanks removed.

Copper-Alloys with High Strength and Conductivity

The ancients discovered a so-called method of hardening copper, the secret of which is said to be lost. In recent times similar methods have frequently been re-discovered, but all of them, both ancient and modern, involve the use of alloying elements which have reduced the electrical and thermal conductivity.

For use in commutators, slip rings and other electrical devices a hard metal is necessary, and high conductivity of heat and electricity are very desirable. A new group of copper base alloys called Cupalloy are said to have a most interesting combination of desirable characteristics. Cupalloy is much harder than pure copper, with much higher elastic limit, and electrical conductivity approaching that of pure copper. Furthermore, the creep strength of this alloy is said to be considerably greater than that of cold drawn copper, and the strength does not deteriorate with time at elevated temperatures as is the case with cold drawn copper. Many interesting tests are said to prove the qualities of this group of alloys, but due to its newness it is not yet in commercial use.

The above information comes to us from the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Compressed Air Drying System

The Ruemelin Manufacturing Company, 1574 S. First Street, Milwaukee, Wis., has developed a drying system for the removal of water and oil from compressed air lines for use with sand blast equipment. This device is automatic and without moving parts to wear out. It consists of an after-cooler which precipitates moisture and oil from the heated air rising from the compressor, a moisture expeller to remove oil and water from the cooled air and an automatic drain trap through which the accumulated oil and water are discharged into the sewer. No attention is necessary in draining off the condensate.

The installation is made in sizes varying from 40 cubic feet to 150 cubic feet, and from pipe sizes from ¼" to 2". Multiple units can be furnished to serve compressors with capacities up to 300 cubic feet.

New Small Melting Pot for Solder and Other Metals

Newton Junior Corporation, 151 Court Street, New Haven, Conn., announces a new portable electric pot for solder and molten metal dips for tinning, dipping, tool hardening, etc., which sells at five dollars. The maker claims for it the following features:

Design maintains close, balanced

temperature constantly while in operation for any period; heat reaches 80% of total possible heating area, eliminating hot spots; full pot requires about 20 minutes to melt the metal; minimum current required for full efficiency; molten metal cannot reach heating chamber; terminals are guarded against overflow or metal drip; insulation is highest grade and thoroughly insulates pot.

The new Newton Junior melting pot uses 110 volts, 275 watts; pot capacity is 4 lbs.; over-all height, 4¼ in.; width, 6¾ in.; shipping weight, 6 lbs.

Ruemelin Drying Unit.

Pyro Radiation Pyrometer

The Pyro radiation pyrometer, made by The Pyrometer Instrument Company, 100 Lafayette Street, New York, it is claimed is a self-contained, rugged, direct reading, dust- and fool-proof unit. It requires no connection with the furnace and is suitable wherever "black body" conditions exist as in furnaces,

Radiation Pyrometer

kilns, etc. There are no accessories and no installation. It gives the actual heat of the material aside from furnace temperature. It does not require a skilled operator. Temperature ranges are from 1000° to 3600°F.

Instruments Exhibited at Chemical Show

At the recent Exposition of Chemical Industries held at New York, the Illinois Testing Laboratories, Inc., 141 West Austin Avenue, Chicago, Ill., displayed a number of instruments used in foundries and other metallurgical plants. These included the "Pyro Lance" pyrometer and various types of electrical meters.

Etching Machine

The "Rotospray" etching machine has been placed on the market by the U. S. Stoneware Company, Akron, Ohio. This machine is designed especially for the photo-engraver but it should be found useful in other etching operations. It is claimed to be the fastest etcher in existence. Details of construction and operation are given in Bulletin 601 of the above company.

New Sanitary Enamel

A new sanitary enamel has been developed by Baer Brothers, 438 West 37th Street, New York, containing no organic compounds which will taint foodstuffs. This enamel, it is claimed, will resist heat up to 400 degrees F. without yellowing. It is recommended for use in food factories, hotel kitchens, dairies, etc. Among the other advantages claimed are that it dries quickly, holds its whiteness almost indefinitely, has a high gloss finish, and withstands smoke and most chemical vapors without discoloration of any kind. It can be furnished in a brushing body or thinned for spraying.

Equipment and Supply Catalogs

Electrical Machinery. Marble-Card Electric Co., Gladstone, Mich. Catalog 33, motors, generators, etc. (61)

Capacitators. Ideal Electric & Mfg. Co., Mansfield, O. Bulletin 710 on box and rack types for power factor correction. (62)

Color and Protection. American Asphalt Paint Company, Chicago, Ill. A beautifully printed booklet in many colors, describing colors and protective coatings used at Century of Progress. (63)

Cadmium Plating Process. Hanson-Van Winkle-Munning Company, Matawan, N. J. Circular on the "Cadux" process, materials and service for bright cadmium plating. Illustrates and lists some applications. (64)

Cleaning and Finishing Equipment. N. Ransohoff, Inc., W. 71st St., at Millcreek, Carthage, Cincinnati, Ohio. A well illustrated catalog of machinery for tumbling, separating, cleaning, washing, burnishing, plating, pickling, etc., issued by a maker specializing in this equipment. (65)

Chemicals. Quarterly price list, January, 1934. E. I. du Pont de Nemours and Company, Inc., The R. & H. Chemicals Department, Wilmington, Del. (66)

Tanks. The Hauser-Stander Tank Company, Cincinnati, Ohio. Catalog 33; wooden and metal tanks for all purposes; 100 pages, fully illustrated and indexed; includes technical data on tanks. (67)

Magnesium Alloy. The Dow Chemical Company, Midland, Mich. Leaflet on Dowmetal in the Stratosphere; includes technical data on the alloy. (68)

Electric Furnace. W. S. Rockwell Company, 50 Church Street, New York. Bulletin 345, belt-conveyor type; illustrated. (69)

Hard-Facing. Haynes Stellite Company, Kokomo, Ind. 96-page illustrated book on use of Stellite products for facing tools and other objects for resistance to wear. (70)

Porcelain Enamel. Ferro Enamel Corporation, Cleveland, Ohio. Bulletin on use of porcelain for making decorative murals. (71)

Set and Cap Screws. Allen Manufacturing Company, Hartford, Conn. Engineering data bulletin showing holding power, and recommended sizes and tightening forces. (72)

Condensation. Nason Manufacturing Company, 71 Fulton Street, New York. 20-page catalog of steam traps, valves and kindred specialties. (73)

Hoists. The Harnischfeger Corporation, Milwaukee, Wis. Bulletin RH-1; hoisting equipment for all purposes. (74)

Literature on Shipping. Acme Steel Company, Chicago, Ill. A new set of literature covering efficiencies and economies effected in preparing boxes and loads for shipment with steel strapping material. (75)

Cleaning Process. Oakite Products, Inc., 22 Thames Street, New York. Bulletin on Saturol, a material for use with a new metal cleaning process. Illustrated. (76)

Aluminum News Letter. Aluminum Company of America, Pittsburgh, Pa. First issue of an interesting pamphlet. Gives new applications, good pictures and other items. (77)

Engineering Achievements. Westinghouse Electric and Manufacturing Company. East Pittsburgh, Pa. Covers events of 1933; 36 pages, well illustrated. (78)

Save time. Use the coupon below to get any of the above catalogs or bulletins, or for data on any subject not mentioned this month. METAL INDUSTRY will see that you get them promptly.

METAL INDUSTRY
116 John Street, New York.

(Insert below the number printed at the end of each item desired.)

I wish to receive the following bulletins mentioned in DECEMBER: .....

.....

I want information on the following equipment or materials also: .....

.....

News of Associations

Institute of Metals Division

The 143rd Meeting of the American Institute of Mining and Metallurgical Engineers will take place at the Engineering Societies Building, 29 West 39th Street, New York, February 19-22, 1934. The meeting will include a number of special features of a social nature, such as a smoker, luncheons, an informal dance, dinners, etc. The technical program of the Institute of Metals Division will take place Tuesday, Wednesday and Thursday, with session morning and afternoon, beginning Tuesday afternoon.

The annual dinner of the Division will be held Tuesday evening at the Commodore Hotel. It will be followed by the usual non-technical talk on an important metallurgical subject. Thursday morning and afternoon (until four o'clock) will be devoted to a round table discussion on Nonferrous Metals in the Electrical Industry. Dr. T. S. Fuller, Chairman of the Division, will open the round table.

The papers listed below are of particular interest to our readers. The following are included in the general program of the A.I.M.E., under Nonferrous Metallurgy:

Wednesday P.M. — Treatment of Drosses in Lead Smelters. By C. M. Dice, G. L. Oldright and T. B. Brighton.

Thursday P.M.—Recovery of Precious and Secondary Metals from Electrolytic Copper Refining. By M. A. Mosher.

Development and Use of Anaconda Electro sheet Copper. By William M. Shakespeare.

Institute of Metals Program

The program of the Institute of Metals Division includes the following papers and discussions:

Tuesday Afternoon

Internal Stresses in Quenched Aluminum and Some Aluminum Alloys. By L. W. Kempf, H. L. Hopkins and E. V. Ivanso.

Testing the Drawing Properties of Rolled Zinc Alloys. By E. H. Kelton and Gerald Edmunds.

Comparative Studies on Creep of Metals Using a Modified Rohn Test. By C. R. Austin and J. R. Gier.

Wednesday Morning

The Lithium-Magnesium Equilibrium Diagram. By Otto H. Henry and Hugo V. Cordiano.

X-ray Studies on the Nickel-chromium System. By Eric R. Jette, V. H. Nordstrom, Bernard Queneau and Frank Foote.

An X-ray Study of the Gold-iron Alloys. By Eric R. Jette, Willard L. Bruner and Frank Foote.

Crystal Orientations Developed by Progressive Cold Rolling of an Alloyed Zinc. By M. L. Fuller and Gerald Edmunds.

Wednesday Afternoon

Influence of Silver on the Softening of Cold-worked Copper. By H. C. Kenny and G. L. Craig.

The Solubility of Oxygen in Solid Copper. By F. N. Rhines and C. H. Mathewson.

The Strength and Aging Characteristics of the Nickel Bronzes. By E. M. Wise and J. T. Eash.

Thursday Morning

(Short joint session at 9:30 a. m. with Iron and Steel Division in room assigned to latter's Open Hearth session.)

Nonmetallic Elements in Metals. By T. D. Yensen and C. H. Herty, Jr.

Thursday Morning and Afternoon

Round Table on Nonferrous Metals in the Electrical Industry.

Introductory remarks by T. S. Fuller, Chairman, Institute of Metals Division.

Topics and leaders of discussion:

High-conductivity Nonferrous Castings in Electrical Apparatus and Equipment. Lyall Zickrick, Research Laboratory, General Electric Co.

Aluminum Conductors.

Copper Conductors.

Alloy Conductors. W. H. Bassett, Jr., Anaconda Wire & Cable Co.

Nonferrous Magnetic Alloys. T. D. Yensen, Westinghouse Electric & Manufacturing Co.

Vacuum Amplifying Tubes. Stanton Umbreit, R. C. A. Radiotron Research Laboratory.

Electrical Contact Alloys. H. O. Siegmund, Bell Telephone Laboratories, Inc.

Cable Sheathing and Soft Solders. G. O. Hiers, Research Laboratory, National Lead Co.

Tungsten Filament Wires. W. P. Sykes, Cleveland Wire Works, General Electric Co.

Thursday Afternoon

Ferromagnetism in Metallic Crystals (Institute of Metals Division Annual Lecture). By Prof. L. W. McKeehan.

American Electroplaters' Society

1934 Convention—Detroit

The Detroit Branch, A. E. S., has organized itself to prepare for the 1934 national convention of the Society, to be held in that city June 11-14, with the Statler Hotel as headquarters.

Reports are arriving from all quarters that progress is being made steadily on the convention preparations, and there is full confidence that the convention will prove highly attractive to the platers of the United States and Canada.

The Souvenir Program has been started, and the committee in charge of it reports progress. On all matters relating to the convention, communications can be addressed as follows: American Electroplaters' Society, Detroit Branch, Hotel Statler, Detroit, Mich.

T. C. Eichstaedt, Secretary.

Chicago Branch

A most successful annual educational meeting and smoker was held January 13 by the Chicago Branch, A. E. S., with about 200 in attendance, including a number of the most representative men in the plating industry in the districts of Chicago, Milwaukee, Detroit, and other cities.

The three-hour educational session was directed by **Oscar E. Servis,** chairman. Speakers were:

Harold Faint, on a Degreasing Machine, which he had set up and used for some interesting experiments.

William Phillips, General Motors Corporation, told of developments in electroplating in the automotive lines. Comparisons were drawn between the lacquer and enamel finishes and the plated finishes used on cars. The former give longer life, it was said, having been developed very highly. Plated coatings must be improved likewise, it was pointed out. Against it is the automobile makers' general policy of specifying minimum thicknesses of deposit. Stainless steel, while useful in the automotive lines, will not supplant the decorative effects of plated finishes. Mr. Phillips advised that the plating be improved in order to keep it from being eliminated from use on automobiles.

C. Soderberg of the Udylite Process Company, Detroit, gave an interesting talk, describing what he has seen in visiting plating plants in various places. He said he was surprised at the lack of systematic arrangement of tanks and other equipment, and advocated improved plating shop layout and methods.

George B. Hogaboom of Hanson-Van Winkle-Munning Company, Matawan, N. J., said plating chemistry is now generally understood, but that chemical control of solutions, while valuable, had not solved many platers' difficulties. Application of metallurgy will some day have important effects on the condition of the work before it arrives for plating, but as yet little thought is given to the effects of various manufacturing processes on the final plating the work is to get. He cited many instances where bad appearance or failure of deposit was directly traceable to operations performed on the work before it reached the plating room.

There was a delightful entertainment after the session, and a buffet supper. This was the first smoker the Chicago Branch has held, and it was so successful that more will surely follow.

American Foundrymen's Association

The board of directors of the American Foundrymen's Association has voted to hold the 1934 convention and exhibition of the Association in Philadelphia, and to arrange a convention without an exhibition for 1935.

The International Committee of foundry technical associations has awarded to the American Foundrymen's Association the honor of holding in the United States in 1934, the Fifth International Foundry Congress and Exposition. The staging of this important event in connection with the annual convention of A. F. A., which is usually held in May, has been set for the week of October 22, a date following the annual conventions of the cooperating European associations.

The Meetings, Exposition, and International Congress will be held in Philadelphia's new auditorium, one of the largest and most completely equipped convention halls in the world.

The overseas countries whose foundry associations are members of the Committee on International Congresses include Great Britain, Spain, Belgium, Czechoslovakia, Italy, France, Germany and Holland. The first International Foundry Congress was held in Paris in 1923, the second in Detroit, 1926, the third in London, 1929, and the fourth in Paris, 1932. Sixteen foreign countries were represented in the attendance at the International Congress in Detroit.

It is the plan of the directors that the 1935 Convention without an exhibit shall be similar in character to the very successful one held at Edgewater Beach Hotel in Chicago in June 1927, following the International Foundry Congress held in Detroit in the fall of 1926.

Connecticut Non-Ferrous Foundrymen's Association

At the January meeting of the Connecticut Nonferrous Foundrymen's Association, held in New Haven and presided over by C. H. Blanchard, manager of Reading, Pratt & Cady Company, Inc., Hartford, the following officers were elected: President, David Tamor, of Reading, Pratt & Cady Company, Inc., Hartford; vice-presidents, G. F. Winslow, Bradley & Hubbard Manufacturing Company, Meriden, Conn.; Wesley Case, Belknap Manufacturing Company, Bridgeport, Conn.; secretary, Louis G. Tarantino, 523 West Taft Avenue, Bridgeport, Conn.

The following were appointed members of the executive committee:

Chairman, O. G. Willey, Jenkins Bros., Bridgeport, Conn.; H. A. Phelps, Phelps Foundry Company, Ansonia; Herbert Thompson, Peck Brothers & Company, New Haven; G. F. Winslow, Bradley & Hubbard Manufacturing Company, Meriden; and Benjamin Stewart, Benjamin Stewart & Sons, Inc., Mt. Carmel, Conn.

Program Committee:- Chairman, O. G. Willey, assisted by F. B. Diana, metalurgist, Whipple and Choate Company, Bridgeport; and S. G. Tarantino.

Following the installation, V. P. Weaver of the technical department of the American Brass Company gave an illustrated lecture on Beryllium Copper.

United Electroplaters League

The New York Chapter of the United Electroplaters League installed new officers for 1934 at an open meeting January 13, at the regular meeting place, Teutonia Assembly Rooms, 183 Third Avenue, New York. The officers were installed by Charles H. Proctor as follows:

President: Dennis W. Kelly (re-elected).

Vice-president: A. Englander.

Financial Secretary: John E. Sterling (re-elected).

Treasurer: Benjamin Nadel.

Recording Secretary: A. M. Kohn.

Librarian: Elias Schor.

Trustees: M. J. Fannon, Frank Klaus, Harry Karlin. Sergeant-at-arms, H. H. Kelly. Assistant sergeant-at-arms, Charles Nardozea.

The meeting was attended by 250, including a number of prominent platers and others, who spoke to the assemblage. These included:

Charles H. Proctor, who inducted the new officers; he gave an address on the relation of capital and labor in the past and in the future.

Dr. L. C. Pan, well known teacher of plating chemistry, spoke on the value of Electroplaters' League to the plater, and of education as carried on by the League to the plater's economic condition.

President Rolfs of the New York Branch of the American Electroplaters' Society, spoke on the value of the League to the plating industry now.

F. J. MacStoker, past president of the New York Branch, A. E. S., spoke on the advisability of platers throughout the country joining the League, which he said, should take in all plating room help.

J. E. Sterling, financial secretary of the League, spoke on the League's aims, and the necessity of co-operation between employers and employees. He pointed out that the employers have become organized, and declared the employees should do so too.

The New York Chapter held its annual entertainment Saturday, January 27. There was a good attendance, and a very enjoyable evening was spent. The Chapter is considering holding a banquet or some other type of gathering for platers and their wives and other friends and guests, sometime in the spring.

A. S. T. M.

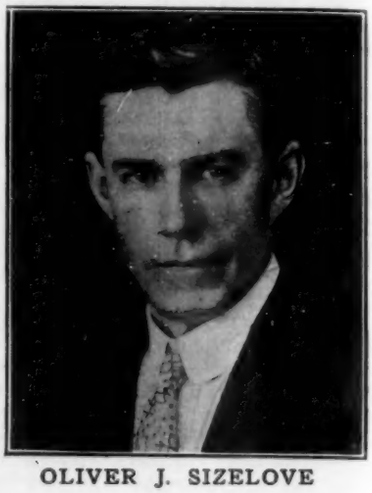
American Society for Testing Materials, Regional and Group meetings, Washington, D. C., March 5-9; Annual Meeting, Atlantic City, N. J., June 25-29.

Personals

Oliver J. Sizelove

Last month we announced briefly that Oliver J. Sizelove, well known electroplating expert, had entered the plating and finishing supply business as general sales representative for Frederick Gumm Chemical Company, 113-115 36th Street, Union City, N. J. We review here the career of Mr. Sizelove.

Oliver Sizelove was born in 1880 on a farm in Butler County, Ohio. He attended primary and high school, and at



OLIVER J. SIZELOVE

18 went to work as an apprentice in the plating and finishing department of the Estate Stove Company, Hamilton, O. He has thus, from the start of his industrial career, been in the finishing lines. He learned every branch of the business, including polishing. In fact, right at the beginning he became an expert polisher of stove parts and also of fine steel work such as is used on sewing machines. He spent thirteen years in the Middle West, working in various plants. The last five years in that section, he spent as foreman of the polishing and plating departments of the Fred J. Meyer Manufacturing Company, Hamilton, O., and the Felker-Mieth Company, Dayton, O.

Mr. Sizelove came east and took a position as foreman plater and polisher with the Bonny-Veslage Tool Company, Newark N. J. Aware of the necessity for chemical knowledge if he was to progress as a plater, Mr. Sizelove studied chemistry for the next five years, after hours, at the Newark Technical High School. Then, with this technical training as well as his long experience, he decided to go into business for himself. He became a partner in the Merigold Plating Company, a job plating concern. He remained in it for a year and a half and then went with the J. K. Osborne Manufacturing Company, Harrison, N. J., novelty makers. After that he went to the Elite Novelty Company, Newark, which specialized in soft met-

als, and there Mr. Sizelove again widened his experience. In 1922 he joined August Goertz and Company, Newark, a large manufacturer of metal novelties. As foreman of the entire finishing department, Mr. Sizelove had ample opportunity to put to use all the knowledge of plating he had gained in his varied experience, and to add to it as well.

Mr. Sizelove has been a member of the Newark Branch of the American Electroplaters' Society since 1914. He has always taken a very active part in the educational activities of the Society, and has presented papers at many of the Newark Branch meetings as well as at the annual conventions of the Society. In 1926 his paper at the A. E. S. convention received the first award. It dealt with simplified methods of plating solution control. He became an Associate Editor of **Metal Industry** in 1929, and since that time has taken care of all our testing and analytical work. In this capacity he has answered questions and settled technical difficulties for hundreds of manufacturers, platers and finishers. He has also contributed a considerable amount of original material dealing with various aspects of plating technology. Besides this, in recent years he has been teaching plating chemistry to a class of platers, at the Newark Boys' Vocational School, by arrangement with the Essex County Vocational School Board.

Frederick M. Feiker has been appointed executive secretary of the American Engineering Council, Washington, D. C., to succeed Lawrence W. Wallace, who has resigned to become vice-president of the W. S. Lee Enginering Corporation. Mr. Feiker was formerly chief of the editorial board of A. W. Shaw Company, Chicago, Ill., publishers, and editor and vice-president in charge of editorial policy for the McGraw Hill Publishing Company, New York. He is an electrical engineer.

T. McC. Black has been appointed Ohio sales representative for Dings Magnetic Separator Company, Milwaukee, Wis. Mr. Black's headquarters are at 1836 Euclid Avenue, Cleveland.

W. K. Leach, formerly with General Alloys Company, Boston, Mass., is now general manager of the alloy division of American Manganese Steel Company, Chicago Heights, Ill. His office is at the plant at 6600 Ridge Avenue, St. Louis, Mo.

Harry L. Derby Jr., Chicago, Ill., district manager for the American Cyanamid and Chemical Corporation, New York, was married January 20 to Mary Katherine Dutrow, daughter of Dr. and Mrs. Howard V. Dutrow of Dayton, Ohio.

John B. Strauch, president of the National Bearing Metals Corporation, St. Louis, Mo., has been elected a member of the board of directors of the General American Life Insurance Company of St. Louis.

Obituaries

Willis R. King

Willis R. King, electroplating expert for the Hanson-Van Winkle-Munning Company, Matawan, N. J., died on November 29, 1933, at his residence, 67 Baldwin Ave., Newark, N. J. He had been ill for three and one-half years.

Mr. King was born in Columbiana, Ohio, the son of the late Rinaldo and Margaret Hoffman King. He came to Newark in 1899 to join the Hanson and Van Winkle Company, manufacturers of electroplating equipment and supplies, and remained with the company steadily

WILLIS R. KING

for thirty-one years, when he was retired on full pay because of ill health.

Mr. King was fortunate in having learned his trade from his uncle, the late J. B. Timberlake of Jackson, Mich. Mr. Timberlake had made a name as a pioneer in the electroplating industry. Mr. King was known nationally for his outstanding work in electroplating processes and methods. He was the inventor of the Capstone and the Capitol nickel salts. It was he who developed a nickel face matrix for phonograph records which made it possible to stamp 20,000 records from the original, leaving that original still usable. He had more than 30 inventions to his credit, one of the most interesting of which was the King dynamo of which many are still in use.

Mr. King was known throughout the electroplating industry, not only for his extraordinary ability but also for his integrity, kindliness and geniality. His friends are numbered in the hundreds all over the country. He leaves a widow, Mrs. Winifred M. King; two children, Eileen and Winifred; and a sister, Mrs. John T. Daniels, also of Newark.

George W. Koehler

George W. Koehler, for many years proprietor of the Koehler Brass Foundry, Cedar Rapids, Iowa, died at that city on December 4, 1933. He was 73.

George W. Fisher

George W. Fisher, vice-president of Fisher Brass, Inc., Marysville, Ohio, died January 5, 1934, of a paralytic stroke which he suffered while in New York. Mr. Fisher, who was widely known in the plumbers' brass goods industry, lived in Marysville.

As sales manager of the company, Mr. Fisher covered the eastern seaboard and middle western states, where he was a well known figure. He went to Marysville from Cleveland in 1917, and was instrumental in reorganizing the old Regal Brass Company, which then became the Regent Brass Company. Later he was important in the consolidation of the Regent, Delaware and Atlas Brass Foundry companies, forming The Fisher Brass Company, with plants in Delaware, Marysville and Bellefontaine, Ohio. In 1931 Fisher Brass, Inc., was formed, and it purchased the assets and goodwill of The Fisher Brass Company, which had gone into bankruptcy. Mr. Fisher became vice-president and sales manager.

The sudden death of Mr. Fisher came as a distinct shock to the many friends he had made in business, as his genial disposition had gained him great popularity among his associates, customers and acquaintances.

Walter Wellman

Walter Wellman, noted Arctic explorer and pioneer aviator, died at New York on January 31, 1934, aged 75. Mr. Wellman attracted the attention of the world to aluminum in 1894 when he took to the Arctic several aluminum boats, which proved highly useful to his expedition. He was, in 1910, the first man to attempt to cross the Atlantic by dirigible.

John Heil, Sr.

John Heil, Sr., works manager of the Heil Company, Milwaukee, Wis., died January 9, 1934, aged 62. Mr. Heil was the elder brother of Julius P. Heil, president and general manager of the company, which is a large manufacturer of metal products. Mr. Heil was born in Germany and came to America as a boy. He joined the Heil company shortly after it was established.

Otto J. Boettcher

Otto J. Boettcher, general superintendent of the Chilton, Wis., branch plant of the Aluminum Specialties Company, Manitowoc, Wis., died of heart disease December 26, 1933, aged 43.

Industrial and Financial News

Lacquer Makers End Long Litigation Over Patents

A long and hard-fought legal battle over validity of the Flaherty patents on the manufacture of certain lacquers, held by E. I. du Pont de Nemours and Company, Wilmington, Del., came to an end last month when the Glidden Company, Cleveland, Ohio, and Jones-Dabney Company, Louisville, Ky., who were the first companies sued for infringement of du Pont's patents, settled the dispute out of court and took licenses from du Pont. The du Pont company, in turn, announced a reduction in the license fee from $3000 to $1000, and is said to be making certain other concessions in settlements with lacquer makers owing back royalties.

The case had been in progress for several years, and had become a "cause celebre" in the lacquer industry. In 1931 a group of lacquer makers other than du Pont formed Lacquer Trustees, and, led by Frank G. Breyer of Singmaster and Breyer, metallurgists and chemical engineers, New York City, went to court to aid Glidden, and won. On appeal, du Pont won a reversal of the decision. Glidden was now expected to take the matter to the Supreme Court, and the settlement out of court came as a surprise to the industry.

Frank G. Breyer, consulting leader of the group opposing du Pont, made a statement last month in which he pointed out that although the legal battle had not been a complete victory, nevertheless important results had been obtained. He pointed out that reduction in the license fee to $1000 would save some 200 or more small makers of lacquer about $400,000 a year; that much will be saved on back royalties; that the scope of lacquer patent control had been limited and defined clearly; and that the part of the District Court's decision against the Flaherty patent had "been accepted by most informed lacquer men as correct."

Silver Dollar Pay Roll

Burgess Battery Company, Freeport, Ill., paid its 500 employees and executives half a month's wages in silver dollars on January 20, using $40,000 worth of the coins.

Dr. C. F. Burgess, the company's board chairman, said the experiment was to demonstrate the soundness of the silver dollar; to show how the Burgess payroll flows through the business community of Freeport affecting all lines; to center the interest of the country's citizenry on the silver question.

Burgess Battery Company is one of a number of affiliated Burgess companies which manufacture and market the developments of the C. F. Burgess Laboratories, founded 25 years ago by Dr. Burgess. Besides electrical products, these companies produce alloys and other metal products.

Orders Recheck on "100% Aluminum Monopoly"

Describing the Aluminum Company of America, Pittsburgh, Pa., as a "100 per cent monopoly" in production of aluminum, United States Attorney General Cummings at Washington, D. C., last month stated that the Department of Justice is re-investigating the company. Mr. Cummings referred to the interest of the Mellon family in the company, and to the company's interest in the fabrication end of the aluminum industry through subsidiaries. Mr. Cummings also said he had been asked to examine the NRA code of the aluminum industry when it is completed.

Research on Enameling at Mellon Institute

Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, Pa., has announced that the O. Hommel Company, Pittsburgh, Pa., has founded an Industrial Fellowship in the Institute, to conduct scientific research on problems of enamel technology. It is expected to provide technical information through investigations in the laboratory and in plants, supplemented by the experience of specialists in the Hommel and cooperating organizations, including the Enamelers' Guild of Pittsburgh, that will make it a clearing-house of facts regarding frits. Research of the Fellowship will be published for the benefit of enamelers; and advice and information on enameling, and assistance in solving plant problems and in making evaluations or other practical tests of frits, will be extended gratis to companies that wish such technical aid.

Aluminum Piston Patents

Five patents on the manufacture of aluminum automobile pistons were ruled invalid by William B. Woods, Cleveland, Ohio, acting as special master in an infringement suit filed by Cleveland Trust Company, which held the patents in trust. The ruling held the patents invalid because they were granted on skilled production rather than invention. Chrysler Motors was involuntary plaintiff against three small firms distributing pistons made by Sterling Products Company, St. Louis, Mo., and Ray Day Company, Detroit, Mich., allegedly in violation of patent rights. Final decision will be made by Federal Court.

Chrysler Files Petition in Chromium Patent Suit

Chrysler Corporation, Detroit, Mich., filed a petition last month in the United States District Court at Wilmington, Del., stating that it has reason to apprehend that United Chromium, Inc., New York, may again bring a patent infringement suit against it, and asking permission to take depositions of about 42 witnesses and to file their testimony with the court under seal for use in the event of any future controversy between the two companies.

United Chromium brought suit against Chrysler in March 1932. The suit was removed from the docket subject to restoration within one year. The suit was not restored, and in March of last year was dismissed without prejudice to a new suit. United Chromium had alleged infringement of Patent No. 1,581,188 granted April 20, 1926 and No. 1,802,563 granted April 28, 1931.

Automobile Show

The National Automobile Show in New York last month was distinguished for the number of people it attracted, and for the new body designs which feature the leading makes of automobiles this year. The large attendance indicates consumer interest which probably heralds good demand for cars and accessories, which will necessitate heavier plant operations, larger metal consumption, and so on.

The models for 1934 displayed a general trend toward streamline design for the purpose of reducing resistance to wind. This type of design reaches its climax in the new De Soto "airflow" model. The outstanding mechanical device consisted of a new type of front axle suspension which permits what is called "knee action", for the purpose of reducing the jar and shock to riders when the car is passing over rough or bumpy roads. Several types were shown.

A noticeable tendency in the decoration of 1934 cars is a reduction in the area of the plated surfaces. All cars still have a number of plated parts but in many instances the areas covered with colored lacquers have been increased.

The exhibits of accessories and parts were not very numerous, but they included some important factors. Among those who specialized in non-ferrous metals or metal finishing were:

Chemical Industries Corporation, Indianapolis, Ind.; Egyptian Lacquer Manufacturing Company, New York; Nacto Cleaner Corporation, New York; Service Lacquer Company, New York.

Building Modernization Exposition

A Building Modernization Exposition of products and services in the building field was held last month at the new R. C. A. Building in Rockefeller Center, New York. It displayed some interesting applications of nonferrous metals and finishes, especially in such products and devices as air-conditioning equipment, kitchen eqiupment, electrical equipment, and general building construction and maintenance products and equipment. There were displays by the following firms familiar to our readers: The J. B. Ford Sales Company, Wyandotte, Mich., featuring cleaning preparations; The International Nickel Company, Inc., represented by Whitehead Metal Products Company of New York, Inc., showing Monel metal products; Keystone Varnish Company, Brooklyn, N. Y., finishes; American Blower Corporation, represented by American Ventilating Corporation, New York, showing ventilators.

Motor Boat Show

The 1934 National Motor Boat Show at New York City last month disclosed no startling innovations in the use of metals or finishes in the boating field, but the wide use of nonferrous metals and many types of finishes was again reiterated. There has been no displacement, to any extent, in the use of such materials as copper, brass, bronze, nickel alloys, lead, zinc, babbitt and many substances for coatings, like paint, lacquer, enamel, electroplate, hot zinc (galvanizing), etc. As usual, there were some striking exhibits of nonferrous metal products, like bronze and Monel metal propellers and shafts, bearings and bushings, including rubber-lined "Cutless" bearings which have an outer shell of copper-base alloy. Thousands of brass products were on display, as well as a great deal of galvanized (hot zinced) ware.

Among the outstanding exhibits were the following: The American Brass Company, Waterbury, Conn., showing Everdur and Tempaloy alloys for various marine uses; Columbia Bronze Corporation, Freeport, N. Y., cast and fabricated marine products; Joseph Dixon Crucible Company, Jersey City, N. J., graphite lubricants; E. I. du Pont de Nemours and Company, Wilmington, Del., marine paints; Federal-Mogul Corporation, Detroit, Mich., nonferrous marine castings; The B. F. Goodrich Rubber Company, Inc., Akron, Ohio (represented by Lucian Q. Moffitt, Inc., Akron, Ohio, distributor), rubber-lined bronze bearings; The International Nickel Company, Inc., New York, Monel and nickel alloy products for marine use; L. O. Koven and Brother, Inc., Jersey City, N. J., tanks and galvanized products and galvanizing service; M. L. Oberdorfer Brass Company, Syracuse, N. Y., brass products; Pyrene Manufacturing Company, Newark, N. J., plated products, chiefly fire extinguishers.

Business Items---Verified

Superior Brass and Aluminum Casting Company, Lansing, Mich., recently moved to 326 Hill Street. Company operates complete nonferrous foundry. Move was made for other reasons than increased business, according to **C. D. Coffman.**

Ferro Enamel Corporation sales in December were the largest in company's history, being 400% above December, 1932, acording to **R. A. Weaver,** president. Sales for the year 1933 were 33½% above 1932. An extra bonus was distributed to the entire organization.

St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y., on February 5 began a course in metal radiography at its laboratory. It will be conducted two evenings a week for eight weeks, and will include all phases of X-ray and gamma-ray inspection of engineering materials. Complete information is available from the company.

Standard Sanitary Manufacturing Company, Pittsburgh, Pa., plans an addition to its Canadian branch plant, to cost over $60,000 with equipment.

Aluminum Industries, Inc., Cincinnati, Ohio, announces reorganization of its sales and advertising departments. **C. W. McDaniel** has resigned as director of sales and advertising, and under the new set-up **Bruce V. Keller,** district manager, becomes advertising manager, and **W. E. McIlroy** sales manager; the latter was previously in charge of field sales.

Pratt and Whitney Aircraft Company, Hartford, Conn., subsidiary of United Aircraft, has contracts for 91 of the company's recently-developed twin-row radial Wasp motors, to total about $800,000.

American Cyanamid Company, has leased 120,000 sq. ft. on several floors of the R.C.A. building in Rockefeller Center, 30 Rockefeller Plaza, New York, and will move there about April 1. Present offices are on 25 floors of the building at 535 Fifth Avenue. A number of the Cyanamid subsidiaries will move to the new location. The company is a major producer of chemicals. Its consolidated net earnings for 1933 are estimated at over $2,000,000, the company reports.

Zandt Brass Foundry Company, Seattle, Wash., has moved to 2727 Seventh Avenue South, from its previous quarters on Railroad Avenue. Company operates complete nonferrous foundry, casting shop and grinding department. **John Zandt Sr.,** is president.

Anchor Brass Works, 405 67th Street, Houston, Texas, is seeking catalogs covering supplies and equipment for brass foundry and plating plants. **V. R. Eades** and **O. Minzenmayer** operate the plant, which operates a nonferrous foundry and finishing departments.

Metal Specialty Company, 1533 Riverside Drive, Cincinnati, Ohio, has leased factory at Este Place and B. & O. R. R., and will remodel for its own use. Expects to remove to new location this month.

Tower Craftsmen, Inc., 30 East 21st Street, New York, lamp manufacturer, is planning installation of an electroplating department.

Progressive Electroplaters, 3743 North Broadway, St. Louis, Mo., has been established by M. A. Schaefer, to do copper, nickel and chromium plating. Firm wants literature on plating and finishing equipment and supplies.

Sandusky Foundry and Machine Company has succeeded Paper and Textile Machinery Company, Sandusky, Ohio. New name is original style of company, which was established in 1904, and is being re-adopted as it more accurately indicates firm's business and facilities. It operates a complete nonferrous foundry, producing all kinds of castings, and specializing in centrifugally cast tubular or circular castings in bronze, copper, aluminum, monel, etc. No change has been made in ownership or management.

Enzinger Union Corporation of New York City and Germany has established a branch plant at Angola, N. Y., and will equip and operate a brass machine shop there with about 35 employees. Company has 25,000 sq. ft. of space.

Ohio Electrical Specialty Company, Troy, Ohio, is planning to enter the electroplating business. **O. E. Bowman** is in charge.

General Plating and Manufacturing Company, 97 Water Street, Rochester, N. Y., is in the market for one or two oblique plating barrels; preferably used.

DEVELOPMENTS

Nickel is reported to have been discovered by the Japanese in Korea over an area of 16½ million acres, the ore running 2.51 to 3 per cent nickel, 50 to 60 per cent iron, and also some copper, cobalt, sulphur, etc. The deposits are said to compare favorably with Canadian and other mines as regards purity of metal.

New Incorporations

Jewett Stove and Foundry Corporation, Military Road, Buffalo, N. Y.; to take over and operate business of Jewett and Company, stove manufacturers; will make stoves and iron and nonferrous castings, operating complete foundry and casting shop, stamping, plating, polishing, grinding and lacquering departments. S. S. Jewett, president; LeRoy L. Bickerstaff will manage plant; John Oakley is foundry superintendent.

Norquist Products, Inc., Chandler Street Extension, Jamestown, N. Y.; bedroom furniture and other metal products; operating stamping, soldering, plating and lacquering departments; Glenn Norquist, president. Company has leased with option to buy the A. C. Norquist Company plant.

Secondary Metal Output Put at 32% of Virgin

United States production of secondary copper by primary producers in 1933 amounted to 75,050 tons, according to the United States Bureau of Mines. This was 32% of the total domestic virgin copper output of 240,300 tons. In 1932 figures were secondary copper output of primary producers was 60,227 tons, or 27% of the virgin copper output of 222,539 tons.

Metal Developments

Tin Coating. A new British industry for coating wood with metallic tin by a spraying process has been started in London, according to Doremus and Company, 43 Broad Street, New York..

Chromium. According to a report from United States Consul R. W. Heingartner at Frankfort-on-Main, Germany, the I. G. Farbenindustrie has patented a process of depositing an intermediate coating of cobalt or nickel under a coat of chromium. The subsequent heat treatment takes place in a neutral atmosphere and at a temperature slightly below the melting point of the intermediate metal. Such platings are said to possess great heat resistance.

Brass Rails for drinking bars is being displaced by new designs calling for terazzo steps and other types of footrests, according to displays at the recent National Hotel Exposition at New York.

Brass Ingot Orders Gain

On January 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute, Chicago, Ill., amounted to a total of 14,447 net tons, as compared with 13,465 tons December 1, 1933.

The combined deliveries of brass and bronze ingots and billets by the members of the Institute for December 1933, amounted to 2,145 tons, as compared with 2,663 tons delivered in November.

Average prices per pound received by the Institute members on commercial grades of six principal mixtures of ingot brass during the twenty-eight day period ending January 26, 1934, are as follows, with comparative prices reported for the period ended December 29:

Grade	28 Days Ended Jan. 26	Ended Dec. 29
Commercial 80-10-10	9.543c	9.820c
Commercial 78%	7.495c	7.548c
Commercial 81%	7.532c	7.751c
Commercial 83%	7.638c	8.001c
Commercial 85-5-5-5	8.052c	8.271c
Com. No. 1 yellow	6.259c	6.507c

Metals in Automobiles

The automobile industry in 1933 took a good part of the total consumption of nonferrous metals of the United States, according to the National Automobile Chamber of Commerce whose percentages follow: copper 11%; lead 10%; aluminum 25%; nickel 28%. Tin figures are not included in the report, the metal being imported, but it is estimated that the industry used about 5,000 tons of the metal last year.

Society for Metals

For the first time the National Metal Congress and Exposition will be held in New York City. The week of October 1-5, 1934, has been selected as the date, and Commerce Hall in the Port of Authority Building, at 14th Street and Eighth Avenue, has been chosen for the site of the Exposition.

The American Society for Metals (formerly American Society for Steel Treating), under the auspices of which the Congress and Exposition are held every year, made these decisions at their latest meeting.

All exhibits will be located on one floor, with 160,000 square feet of space available. There will be no restrictions as to floor loading or operation of exhibits.

"We have long wanted to have the Congress and Exposition in New York," W. H. Eisenman, Secretary of the Society said, "but until now no suitable building has been available. Definite arrangements have been made that rates for services and connections will be the same as those which our exhibitors have enjoyed in Cleveland, Detroit, and elsewhere." Floor plans will be available about March 15.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

February 1, 1934.

All officers of the **Chase Companies, Inc.**, were reelected at the annual meeting last month. Officers of the **Chase Brass and Copper Company**, selling subsidiary, were also reelected.

The directors of the **Scovill Manufacturing Company** on Jan. 1 declared the regular quarterly common dividend of 25 cents, payable Jan. 2. Declaration was delayed to save stockholders the 5% stock tax which expired Dec. 31.

Lux Clock Company reelected officers and directors at its annual meeting last month.

Benrus Clock Company of New York and Newark, N. J., has leased three floors of the building formerly used as a crystal factory by the **Waterbury Clock Company**, from Industrial Properties, Inc., which purchased the property from the latter company some time ago. It is now moving machinery in and expects to start operations with 200 employees this month, and make this its main headquarters. Eventually its entire product will be made here. The concern will buy its heat and its direct-current power from **Waterbury Clock.** It is understood that the company's product will not be competitive with that of Waterbury Clock, as it makes jeweled watches of a higher grade than the local concern. Some months ago it bought the rights of the "Little Alden" watch from Waterbury Clock. Already, many former employees of Waterbury Clock have been engaged.

Among local patents granted last month was one on a metal soap dish to **Charles Mosgrove,** assignor to the **Autoyre Company**; and one on a pressure gauge to **Loren Durner.**

Employees of **Waterbury Clock Company,** belonging to the **International Jewelry Workers Association,** sent five delegates to the hearing in Washington last month on the clock makers code. The local union contends that Waterbury Clock is not conforming to the NRA, and objects to the proposed clock code because of the lower wage scale for women, and the failure to give labor representation on the code committee. It has made charges to the national labor board that during the recent shutdown the company hired back employees only on condition that they would not join or continue as members of the union.

In answer to some of these charges, **James R. Sheldon,** president of the company, said that the company "is operating under the code of fair competition submitted to Washington for the clock industry." With regard to the union's claim that the company does not recognize it in dealing with the men, he said:

"The matters of collective bargaining, recognition of unions, etc., are matters prescribed by every code; and if and when our code is approved we will be bound thereby."

The Employees' Protective Association, called by the Jewelry Workers "the company union," issued a statement denying that it is, and stating that it was formed without any direction from the company, and that no foremen, representatives or members of the management of the company, can be representatives or executives of the association.

The Jewelry Workers have made a charge to the national labor board to the effect that the so-called company union is illegal in that it was not organized under the supervision of the regional or national labor board.

Officers of the **Waterbury Buckle Company** were reelected last month.

Papers have been filed for the incor-

poration of the **Tube Engineering Company** in this city. Capital is set at $50-000, and three New York lawyers are the incorporators. W. R. B.

Connecticut Notes

February 1, 1934.

HARTFORD — Veeder-Root Company's business in 1933 equalled the total volume for 1930, its officials state. It is now in receipt of an order for several thousand of its new counting devices, which combines the feature of measuring and computing the cost of gasoline delivered from filling stations, from the **Wayne Company,** Ft. Wayne, Ind. This order will keep the shop busy for several weeks.

NEW BRITAIN—North and Judd Manufacturing Company declared its regular quarterly dividend of 25 cents a share on Jan. 1. **Fafnir Bearing Company** declared its regular dividend of 75 cents a share, payable Jan. 5. **Stanley Works** declared the regular dividend of 25 cents a share on common and 1½% on preferred, payable Feb. 3.

P. & F. Corbin and the **Landers, Frary and Clark** plants closed for a vacation of 10 days on Jan. 1.

George T. Kimball, president, **American Hardware Company** says that as compliance with the codes becomes more widespread, business conditions will be bettered. His own company's business, he said, being dependent on the construction industry, is not expected to show much increase in volume for some time to come, although he expects it will be on a more satisfactory basis than last year.

Clarence F. Bennett, president, **Stanley Works**, expressed the belief that for five years a shortage of residential building has been developing and that with even a gradual improvement in business this shortage will be made up. This must help make more business for his concern, he said.

Business is on the upgrade according to **Charles F. Smith,** chairman of the board of **Landers, Frary and Clark.** His company's business now is better than a year ago, and he expects better business this year, although it will be a long time before it gets back to normal.

BRISTOL—Horton Manufacturing Company has revamped its capital structure.

New Departure Manufacturing Company has retired its outstanding issue of $500,000 preferred stock at $115, and revised its common stock capital, retiring 24,000 shares. **General Motors Corporation,** which owns it, has arranged to operate it as a division of General Motors.

MERIDEN—International Silver Company has acquired control of the **Manning-Bowman Company,** having bought at least 50% of the concern's stock. At the annual meeting of the company, the following were elected to fill vacancies on the board of directors: **C. R. Gardinor** and **E. C. Stevens,** president and vice president, respectively, of International Silver; **H. C. Wilcox,** International's director of holloware sales; and **Herbert Reeves,** assistant treasurer of International. Manning-Bowman manufactures Britannia ware, silver plated hollow ware, and electrical household appliances; it pioneered in the manufacture of percolators in this country, having obtained its original patent in 1876. It has 64,000 shares of Class A participating and preferred no par value stock, and 64 shares of Class B common.

BRIDGEPORT—Underwood-Elliott-Fisher Company is making of further concentration of operations at its local plant. Two carloads of machinery arrived last month from its plant at Harrisburg, Pa., and it is understood the entire plant will be transferred here.

TORRINGTON — Torrington Company last month paid its regular common dividend of 75 cents.

BERLIN — Prentice Manufacturing Company, after 10 years of litigation, has won what is believed to be the final fight in the suit brought against it by the **Hookless Fastener Company,** Meadville, Pa., claiming infringement of patents. The first suit, brought in 1924, was decided against the local concern; it appealed, finally carrying it to the Federal Court of Appeals in New York, which decided in the local concern's favor. The company has had to put up bonds totalling $50,000, which will now be returned. It has also had to defend suits brought against its clients by the Pennsylvania concern, and recently won a suit brought against it in Canada on 14 counts by the same company. The local concern is one of the largest manufacturers of "zippers" and glide fasteners in the country.

MIDDLETOWN—Business of **Russell Manufacturing Company** is showing considerable improvement, and it is expected that the receivership, which has been in force for several years, will soon be removed. W. R. B.

Providence, R. I.

February 1, 1934.

The monthly payroll report issued January 15 by the Brown University Bureau of Business Research indicates the trend of industrial activity in Rhode Island. Payroll withdrawals from Rhode Island banks in December were $11,566,183, or 5.4% below November, but 11.3% over December, 1932. The figures for nonferrous industries were as follows: jewelry and silverware, December $688,812, November $797,498; nonferrous metals, December $114,055, November $118,127; machinery and hand tools, December $457,209, November $441,512.

Metal trades employment during December was one per cent over November, according to the Commissioner of Labor. The jewelry industry employed 12.7% more persons in December than in the same month of 1932, and the metal trades employed 13.7% more. As compared with December, 1931, there were 11.8% fewer persons employed in December in the jewelry trades and 6% fewer in the metal trades.

New England Manufacturing Jewelers' and Silversmiths' Association is arranging to hold its annual banquet, which it is planned for the latter part of February, on a date to be fixed subject to the engagements of the speakers that are to be invited.

Metal Finding Manufacturers met at the Narragansett Hotel January 3, **President Frederick A. Ballou, Jr.,** presiding. Following a luncheon, routine business was transacted and a discussion of the recently effective code for low and medium priced jewelry was held.

Krasner and Company have moved from 101 Sabin Street to larger quarters at 107 Stewart Street.

Alco Jewelry Manufacturing Company, 85 Sprague Street, is owned by **Albert Weiner,** according to his statement filed at City Hall.

Shelliod Chemical Company, Smithfield, R. I., has been incorporated to manufacture lacquers, etc., with authorized capital stock of $25,000, by **Richard E. O'Donnell** of Greenville, R. I.; **Herbert E. Mathewson** and **Clifford A. Brownell.**

Losses amounting to more than $7500 were suffered by **T. F. McDermott and Company,** manufacturing jewlers; **Frank H. Hairbrother,** electroplater; and **James J. Farrell,** enameller, in a fire in the three-story wooden building at 111-117 Friendship Street, on December 30.

Frank J. DeMisschop, general manager, **United Wire and Supply Company,** has been elected president of the Cranston Chamber of Commerce.

Genser Manufacturing Company, Inc., has made extensive alterations in its jewelry manufacturing plant at 113 Point Street. W. H. M.

Middle Atlantic States

Newark, New Jersey

February 1, 1934.

Bunting Brass and Bronze Company, Toledo, O., has established a direct factory warehouse at 419 Plane Street, Newark. The warehouse will be operated by Squier, Schilling and Skiff.

Munning and Munning Inc., manufacturers of polishing compounds and buffing materials, have removed from Philadelphia to a plant at 202 Emmett Street. Some years ago the Munning family was represented in the same business in Newark, in the firm of Zucker and Munning, subsequently Munning and Company. The Hanson-Van Winkle Company merged with the old Munning concern, and they moved to Matawan; they are now operating as Hanson-Van Winkle-Munning Company.

Alexander T. Schenck has been appointed receiver for the **Rex Manufacturing Company,** lamp manufacturers,

125 Jersey Street, Harrison, N. J. An involuntary petition in bankruptcy has been filed against the concern by creditors. **William J. Desmond** is president, and **Martin A. Desmond**, his brother, is treasurer of the company. C. A. L.

Trenton, New Jersey

February 1, 1934.

Some of the metal plants report business has dropped off during the past few weeks, and that the remainder of the winter does not look very encouraging. **Edgely Brass Company,** Edgely, Pa., announces that business has decreased. On the other hand, some of the Trenton plants say business remains about the same.

The big plant of the **American Salpa Company,** Spotswood, N. J., which was acquired by the **Titantium Pigment Company,** New York, will be rebuilt, and employment will be given to several hundred hands. The company declares that its orders have increased during the past two months.

M. Hoagland's Sons Company, Rockaway, N. J., will rebuild its plant on Maple Avenue at a cost of $50,000. Company makes machinery. C. A. L.

Central New York

February 1, 1934.

H. T. Dyett, chairman of the board of the **Rome Company, Inc.,** Rome, N. Y., has issued this statement about the company:

"The present management of the Rome Company recognizes that the company for many years past has made good products. It is now aiming to improve and broaden its line. The management has not only recently strengthened its own organization, but is glad to announce that **Norman Bel Geddes,** foremost industrial designer, has been retained. Mr. Bel Geddes' first work for Rome is the creation of the entire 1934 line of beds. Interest has been acquired by the Rome Company in the **Warren McCarthur Corporation,** and the Rome Company will act as exclusive distributor for its line of anodic aluminum furniture. The policy of the company will be to sell its products through the better stores, and do all possible to assist in promotion of the sale of Rome products."

Officials of the company explained that anodic aluminum is treated by a special electrolytic process that gives it a surface coat of aluminum oxide, which is extremely hard. **E. D. Bevitt,** secretary of the Rome Chamber of Commerce, said the product is resistant to tarnish, scratches and weather, requires no polish, and will not smudge off on clothing or upholstery.

Robert T. Kent, vice-president of **Divine Brothers Company,** buff manufacturers, Utica, spoke on the "Art of Metal Finishing", before the University Club in Utica last month.

Richardson and Boynton, Utica, manufacturers of heating equipment, plan to resume operations after inventory.

Rumors continue that the **Remington Arms U.M.C. Company,** for 80 years the center of the company's gun manufacturing division, will be moved to Bridgeport, Conn., from Ilion, N. Y., but company officials at Ilion say they know nothing about the plan.

February 3 was the date set for a conference in Buffalo between executives of **Remington Rand, Inc.,** national union labor representatives, and the Labor Board, over disputes existing between management and labor in the Remington Rand typewriter plants. Announcement of the meeting was made by **Arthur L. Giles,** member of Central Labor Council, Ilion.

Industrial Association of Utica reported business activity the past month in the Utica territory had been on the decline, but that the "dropping off was seasonal" and that "hopes for a pick up in the early spring" are expressed by Utica manufacturers.

A newly organized corporation of which **C. A. Xardell,** Utica, is head is planning to manufacture spark plugs here. The **Xardell Corporation** plans to extend its lines to motor equipment later.

The factories of **Oneida Community, Ltd.,** closed late in January for a week of inventory. During the week the sales force held its semi-annual sales conference.

John Rauschke was elected president of the Utica Sheet Metal Contractors Association.

Russell Proper, 42, employed in the metal mill of the **Revere Copper and Brass Corporation,** was fatally injured in the casting room when a pile of copper slabs weighing about 50 pounds each fell on him.

Frank M. Potter, Rome, has been granted a joint patent with **Edgar W. McKnight** covering a new type of electrical cable, rights to which have been assigned to the **General Cable Company.**

Paul B. Andrews, Rome, was granted a patent covering a flexible insulated pipe, rights to which have been assigned to the **Revere Copper and Brass Corporation.** E. K. B.

Middle Western States

Detroit, Michigan

February 1, 1934.

Revival of the automobile industry during January greatly stimulated many lines where metals and finishes are concerned. The many refinements on the new cars are largely developed from these metals. The big problem now is to maintain production throughout the coming months. At present it looks as if this might be accomplished to a greater extent than was at first expected. The New York and the Detroit shows have revealed there is no lack of interest in, and an intensely growing desire for, the latest motor cars.

Most of the plants in this area have been going strong for several weeks, largely in preparation for the first car showings. Now they are engaged in production to meet mounting sales requirements.

Production on the part of manufacturers of refrigeration units continues steadily, and with the approach of spring months promises outstanding increases. This industry is one of the few in this area that has maintained a fairly even keel throughout the troublesome days of the past year. Favorable expressions also come from manufacturers of vacuum cleaners. This industry was much depressed for a time but within recent months has shown a steady improvement.

Manufacturers of plumbers' and steam fitters' supplies continue to drag along. Production is at a low ebb, and at present there seems to be nothing in sight to denote an early change.

The plating industry is making favorable progress, and is keeping pace with manufacturers of motor car accessories.

Steady improvement in business during the last six months of 1933, and the scientific advances by manufacturers in developing new models of vacuum cleaners should make 1934 the best business year since 1929, according to **Fred Wardell,** president, **Eureka Vacuum Cleaner Company.** "I believe," he said, "that the same situation that prevails in our industry is true in most of other manufacturing lines. Executives in our line are looking forward with a feeling of optimism and are making plans with confidence."

Continental Die Casting Corporation has moved from its old location on Melville Avenue to larger and more modern quarters at 2950 Woodbridge Street, Detroit. The increasing demand for zinc pressure die castings has been largely responsible for the change, it is said. This company has advanced steadily since its inception in 1929, and maintains the latest type of high pressure die casting equipment, together with complete facilities for machining, as well as nickel and chrome plating.

According to **Harlow H. Curtice,** of Buick, production is being speeded up to meet the increased demand for the 1934 models. The output has been stepped up to 360 cars a day, he said, with a projected schedule for the month of 9,000.

The Muskegon, Mich., plant of the **Norge Corporation,** refrigeration manufacturers, has recalled its manufacturing force to fill a 50-car order for Norge equipment for shipment to eastern distributors. Orders on hand and future prospects point to a continuous produc-

tion schedule until mid-summer, it is reported.

An unusual demand for motor cars has led to an order reopening two outside assembly plants of the **Ford Motor Company** and increased production at the eight plants now operating. The plants to reopen are at Dallas, Tex., and Norfolk, Va., which are to start operating early in February, each recalling approximately 1,000 men, it is said.

F. J. H.

Toledo, Ohio

February 1, 1934.

Industrial conditions in Toledo and the surrounding area have improved decidedly. Most of the metal working plants are now actively in production, with prospects that they will continue so for a considerable time.

Manufacturers of automobile accessories are particularly active, although, of course, they are not in full production. But it has been a long time since these plants have been so active.

The plating concerns are giving a good account of themselves. With the revival of manufacturing they have kept pace with the demand. Toledo also has a varied line of industries that maintain their own plating plants, and only few exceptions are recorded where progress is not being made by them.

Reorganization of the **Willys-Overland Company,** motor car manufacturers which went into receivership last February, is possible, according to **L. A. Miller,** president. Strenuous efforts are being made to get this fine plant in production again.

F. J. H.

Chicago, Illinois

February 1, 1934.

Zenith Radio Corporation has closed a deal with the **Hudson Motor Car Company** to supply auto radios for Hudsons and Terraplanes in 1934, supplanting the make formerly used by Hudson. Radios will be standard on the de luxe models and optional on others, and will bear only the Hudson name-plate. These were shown for the first time at the New York automobile show this January. Zenith radios will also be sold through Hudson accessories departments.

Actual retail deliveries of 1934 model **Nash** automobiles in November and December were from 65% to 265% above those recorded for the same weeks of 1933, according to **C. H. Bliss,** vice president.

Studebaker sales in the fourth quarter of 1933 totaled 18,699 cars and trucks, according to **Paul G. Hoffman,** president. This makes the best fourth quarter in five years. Total sales for the year were 48,147 cars and trucks, compared with 47,733 in 1932.

Following the election of **Joseph E. Otis, Jr.,** as president, and **T. T. Sullivan** as acting secretary, production and manufacturing departments of **Stewart-Warner** are being re-organized. Rearrangement of Chicago factories has begun, and it is planned to discontinue use of 460,000 sq. ft of floor space. A new line of electric refrigerators is being introduced by Stewart-Warner.

The bankruptcy petition filed against the **Grigsby-Grunow Company** was dismissed. The court held that insolvency was not shown by the petitioners. With the recent addition of 600 workers, more than 2,000 will soon be on the Grisby-Grunow payroll. December sales were not only the largest for any December in the company's history, but the 20,000 radios shipped were more than the combined total for Decembers of 1932 and 1931. Total sales for 1933 were in excess of 370,000 sets, according to **Le-Roi J. Williams,** general manager.

Kenneth Curtis, president of **Curtis Lighting Inc.,** was elected president of the **Electrical Association** for 1934.

Fifty jewelry manufacturers specializing in college and fraternity pins held a meeting last month and formally protested against the N. R. A. They will organize a committee to go to Washington to ask for modification of the code.

Among the new incorporations here are the following:

Shakeproof Lock Washer Company, 2501 North Keeler Avenue; to manufacture screws, dies, machinery parts and metal specialties.

Commercial Electro Platers, Inc., 121 East 24th Street; electroplating and metal finishing.

Screw Machine Company, 9 South Clinton Street, to manufacture machinery, metals, tools and appliances.

R. G. K.

Pacific States

Los Angeles, Calif.

February 1, 1934.

Murray Steel Products Company is operating its new $150,000 plant at Hollydale, near here, making kitchen ware and kindred products, and various types of metal stampings.

General Cable Corporation has started production of copper cable and wire at its plant here, using metal refined at Tacoma, Wash.

Stoody Company, Whittier, Calif., has lost its suit against the **Mills Alloys Company** here for alleged infringement of a welding idea. The court ruled the process is not an invention and could not be patented.

Robley C. Williams of this city has invented a new aluminum-coated mirror which is said to be 100 times as effective in studying ultra violet radiation of the stars as the silvered mirrors heretofore used.

Utility Fan and Manufacturing Company, 25th and Alameda Streets, has developed a new fan for use in refrigeration of fruit cars.

Eric Magnussen, well known silverware designer and craftsman, formerly with Gorham's in the east, has come to Los Angeles.

Lockheed Aircraft Corporation, Burbank, Calif., has orders for $100,000 worth of metal airplanes. They are just starting in the metal plane line.

Mueller Company's new factory to make copper and brass pipe fittings and other plumbers' goods is nearly finished. It is at 2801 East 12th Street.

Austin Company, making motor cars, will in future confine manufacturing to the Pickwick plant at Inglewood, Calif.

James H. Knapp, 4920 Loma Vista Avenue, industrial furnace manufacturer, has added to its line gas-fired salamanders and steering stabilizers for automobiles.

Rose Lighter-than-Aircraft Company, Van Nuys, Calif., has started a factory to build dirigibles to cost $125,000 each. Hulls will be of metal, probably aluminum alloy. **Thad Rose** is the inventor.

Controlled Indicators Company, 3871 Wilshire Boulevard, is producing a device for warning people of the approach of time for appointments, radio programs, stage work, street traffic, etc., like a robot secretary.

Gefroj Studio, 4840 West Washington Boulevard, silver art object and jewelry maker, is making extensive alterations at its factory. Company has created a sensation with metal objects having real butterfly wings in them.

Security National Aircraft Corporation, Downey, Calif., has started a factory to make planes with folding wings.

San Francisco, Calif.

Dalmo Manufacturing Company, making flush valves, plans a national distribution campaign.

American Heating and Ventilating Corporation has been incorporated by J. M. Cartwright and A. Serveau, and will manufacture at Oakland.

Perry B. Miller, 4011 Brighton Avenue, Oakland, is now Pacific Coast representative for Enterprise Aluminum Company, Massillon, Ohio; Union Steel Chest Corporation, Le Roy, N. Y.; and John T. Leadstone, Merchandise Mart, Chicago, Ill.

A. Gehri and Company, 1117 Tacoma Avenue, Tacoma, Wash., is making Silentaire air conditioning equipment.

Bishop and Babcock Company, 953 Mission Street, is producing a new line of beer dispensers and copper and brass fittings, repairs, etc.

Western Stopper Company, 25th and Potrero Streets, will make crown caps for bottles.

Universal Gear Corporation has appointed **Haultrain Industrial Chain Company** here to act as Northern California distributors.

Watrola Corporation here has started manufacture of a new gas heater invented by **Otto W. Hahn,** on which $300,000 was spent for development.

H. S.

Metal Market Review

February 1, 1934.

January was a dull month, generally, in nonferrous metals. Except for a monetary spell of active trading immediately after announcement of the Government's monetary policy, business was not very heavy in any line.

Copper averaged slightly higher in price, and it was predicted that consumption in January would show a gain over December. Code difficulties still confront the industry. Fabricators reported a slight improvement in specifications. At this date copper is available at 8c. delivered Connecticut.

Lead remained on a fairly even keel throughout the month, and averaged slightly higher in price as compared with December. The volume of business was not heavy. Refined lead production in 1933 was 252,500 tons, according to the Bureau of Mines. This was a drop of 1% from 1932, and a new low record since 1899. The price at this date is 3.90c. St. Louis.

Zinc business was not heavy in January, and the price average for the month, 4.271c. St. Louis, was slightly lower than December. Today's St. Louis price is 4.30c. St. Louis. Bureau of Mines statistics for 1933 show United States production for the year was 307,200 tons, about 48% over 1932 output; deliveries to domestic consumers were about 336,000 tons, or 58% above the 1932 figure.

Tin quotations declined slightly in January, the average for the month being 51.891c. New York, for Straits, as against 52.94c. for December. Business was not heavy. The metal was somewhat adversely affected by foreign exchange fluctuations.

There was no change in the aluminum price. It was reported that code differences have largely been ironed out, especially between domestic fabricators; however, there has been some difficulty with importers. A clause designed to prevent discrimination between fabricators, and administration to prevent oppression of independent producers of fabricated aluminum are said to be included in the code so far agreed upon. Aluminum production of the United States in 1933 was estimated in the trade at upwards of 85 million pounds, which is about 20 million pounds below 1932 output. Imports gained sharply last year, it was estimated.

Silver prices were higher in January. Speculators were disappointed by the failure of the President's monetary policy to mention the white metal more specifically. World silver production in 1933 was lower, amounting to about 161,360,000 ounces, against 169,232,000 for 1932. United States output, 20,955,000 ounces, was about 4,000,000 ounces below 1932.

Gold was quoted at $34.06 by the R.F.C. up to January 15; thereafter the Treasury quoted the price, which held at $34.45 until the end of January. Beginning today the Government is authorized to buy gold at $35 an ounce. Handy & Harman, New York, well known as the source of the "official" silver prices, began last month to handle scrap gold, and at this date is paying 6¼c. per pennyweight for gold content of scrap. The assay office in New York is paying $35 per oz., less ¼%, and minus the refining charges.

Scrap metals were fairly steady in price last month, with the exception of the aluminum grades which advanced sharply toward the end of the month.

The Wrought Metal Market

February 1, 1934.

There was no changes in wrought metal prices during January. The volume of business was not extraordinary, although fabricators of copper and brass products reported somewhat better operations.

There is reason to anticipate some good business in metals as the new year proceeds. Automobile production is generally expected to climb steadily, and electrical and refrigeration (including air conditioning) lines are also looking for considerable gains in production, which will take metals of all kinds. These indications are supported by the great interest shown in the several exhibitions in New York last month, including the automobile, motor boat, and building modernization shows. The Government's aid to housing and other construction projects will also aid the metal lines more or less directly.

In line with the above, the plating and finishing industries are expected to show a pickup also. Galvanizers have already shown an increase in operations, as have some of the plating plants in the centers producing automobile equipment.

Daily Metal Prices for January, 1934

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties]

	1*	2	3	4	5	8	9	10	11	12	15	16	17
Copper c/lb. Duty 4 c/lb.													
Lake (Del. Conn. Producers' Prices)	...	8.375	8.375	8.375	8.375	8.375	8.125	8.125	8.125	8.125	8.125	8.125	8.125
Electrolytic (Conn. Producers' Prices)	...	8.25	8.25	8.25	8.25	8.25	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Casting (f.o.b. ref.)	...	8.00	8.00	8.00	8.00	8.00	7.75	7.75	7.75	7.75	7.75	7.75	7.75
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.													
Prime Western (for brass special add 0.05)	...	4.35	4.35	4.30	4.30	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.30
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	...	53.20	52.75	52.75	52.375	51.85	51.90	52.00	52.35	52.10	53.00	52.40	51.85
Lead (f.o.b St. L.) c/lb. Duty 2¼ c/lb.	...	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
Aluminum c/lb. Duty 4 c/lb.	...	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.													
Electrolytic 99.9%	...	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	...	7.30	7.30	7.30	7.25	7.25	7.20	7.20	7.20	7.20	7.20	7.20	7.20
Silver c/oz. Troy, Duty Free	...	44.875	44.75	43.875	44.25	43.875	43.75	43.75	44.00	44.375	45.00	44.625	44.625
Platinum $/oz. Troy, Duty Free	...	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Gold—Official Price[1] $/oz. Troy	...	34.06	34.06	34.06	34.06	34.06	34.06	34.06	34.06	34.06	34.06	34.45	34.45

	18	19	22	23	24	25	26	29	30	31	High	Low	Aver.
Copper c/lb. Duty 4 c/lb.													
Lake (Del. Conn. Producers' Prices)	8.375	8.625	8.50	8.50	8.50	8.375	8.375	8.375	8.375	8.125	8.625	8.00	8.247
Electrolytic (Conn. Producers' Prices)	8.25	8.50	8.375	8.375	8.375	8.25	8.25	8.25	8.25	8.00	8.50	8.00	8.185
Casting (f.o.b. ref.)	8.00	8.25	8.125	8.125	8.125	8.00	8.00	8.00	8.00	7.75	8.25	7.75	7.935
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.													
Prime Western (for brass special add 0.05)	4.30	4.30	4.30	4.25	4.25	4.25	4.25	4.30	4.30	4.30	4.35	4.25	4.275
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	51.25	52.00	51.50	51.50	51.25	51.00	50.60	51.45	51.25	51.10	53.20	50.60	51.883
Lead (f.o.b St. L.) c/lb. Duty 2¼ c/lb.	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
Aluminum c/lb. Duty 4 c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.													
Electrolytic 99.9%	35	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.30	7.15	7.207
Silver c/oz. Troy, Duty Free	44.375	44.50	44.375	44.25	44.25	43.375	43.25	44.00	44.375	44.00	45.00	43.25	44.187
Platinum $/oz. Troy, Duty Free	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	37.00	37.50
Gold—Official Price[1] $/oz. Troy	34.45	34.45	34.45	34.45	34.45	34.45	34.45	34.45	34.45	34.45	34.45	34.06	34.270

*Holiday. [1]R.F.C. price to January 15; Treasury price thereafter.

Metal Prices, February 5, 1934

(Import duties and taxes under U. S. Tariff Act of 1930, and Revenue Act of 1932)

NEW METALS

Copper: Lake, 8.125, Electrolytic, 8.00, Casting, 7.75.
Zinc: Prime Western, 4.40. Brass Special, 4.45.
Tin: Straits, 50.80. Pig 99%, 49.30.
Lead: 3.90. **Aluminum,** 23.30. **Antimony,** 7.20.
Nickel: Ingot, 35. Shot, 36. Elec., 35. Pellets, 40.

Quicksilver: Flasks, 75 lbs., $69.50. **Bismuth,** $1.30. **Cadmium,** 55. **Silver,** Troy oz., official price, N. Y., Feb. 6, 44.00. **Gold:** oz., Troy, Official U. S. Treasury price February 1, $35.00. **Scrap Gold,** 6½c. per pennyweight per karat, dealer's quotation, Feb. 6. **Platinum,** oz. Troy, $38.00.

Duties: Copper, 4c. lb.; zinc, 1¼c. lb.; tin, free; lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	U. S. Duty	Import Tax*
Brass Ingots, Yellow	6½ to 8	None	4c. lb.[1]
Brass Ingots, Red	8¼ to 10½	do	do
Bronze Ingots	9¼ to 12¼	do	do
Aluminum Casting Alloys	13 to 22	4c. lb.	None
Manganese Bronze Castings	20 to 34	45% a. v.	3c. lb.[2]
Manganese Bronze Forgings	26 to 38	do	do
Manganese Bronze Ingots	8¾ to 12¼	do	4c. lb.[1]
Manganese Copper, 30%	11½ to 16	25% a. v.	3c. lb.[2]
Monel Metal Shot or Block	28	do	None
Phosphor Bronze Ingots	9 to 12	None	4c. lb.[1]
Phosphor Copper, guaranteed 15%	12¼ to 15	3c. lb.[2]	do
Phosphor Copper, guaranteed 10%	11¼ to 14	do	do
Phosphor Tin, no guarantee	61 to 75	None	None
Silicon Copper, 10%	18 to 30	45% a. v.	4c. lb.[1]
Iridium Platinum, 5%	$39.25	None	None
Iridium Platinum, 10%	$40.50	None	None

*Duty is under U. S. Tariff Act of 1930; tax under Section 60 (7) of Revenue Act of 1932.
[1]On copper content. [2]On total weight. "a. v." means ad valorem.

OLD METALS

Dealers' buying prices, wholesale quantities:	Cents lb.	Duty	U. S. Import Tax
Heavy copper and wire, mixed	6⅝ to 6⅞	Free	4c. per pound on copper content.
Light copper	5½ to 5¾	Free	
Heavy yellow brass	3⅝ to 3¾	Free	
Light brass	3 to 3¼	Free	
No. 1 composition	5 to 5¼	Free	
Composition turnings	4¾ to 5	Free	
Heavy soft lead	3 to 3¼	2⅛c. lb.	None.
Old zinc	2½ to 2¾	1½c. lb.	
New zinc clips	3⅛ to 3¼	1½c. lb.	
Aluminum clips (new, soft)	14 to 15	4c. lb.	
Scrap aluminum, cast, mixed	9½ to 11	4c. lb.	
Aluminum borings—turnings	5¼ to 5¾	4c. lb.	
No. 1 pewter	30 to 32	Free	
Electrotype or stereotype	3 to 3¼	2⅛c. lb.*	
Nickel anodes	31½ to 33½	10%	
Nickel clips, new	34 to 36	10%	
Monel scrap	11½ to 19	10% a. v.	

*On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, quantity, packing, etc., or discounts, as shown in manufacturers' price lists, effective since December 19, 1933.

COPPER MATERIAL

	Net base per lb.	Duty*
Sheet, hot rolled	15c.	2½c. lb.
Bare wire, soft, less than carloads	12.25c.	25% a. v.
Seamless tubing	16¼c.	7c. lb.

*Each of the above subject to import tax of 4c. lb. in addition to duty, under Revenue Act of 1932.

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Sheet Metal		Wire and Rod	
10% Quality	23 c.	10% Quality	25⅞c.
15% Quality	25⅛c.	15% Quality	30¼c.
18% Quality	26⅜c.	18% Quality	33½c.

BRASS AND BRONZE MATERIAL

Net base prices per pound, mill shipments.

	High Brass	Low Brass	Bronze	Duty	U. S. Import Tax
Sheet	13¾c.	14⅞c.	15¼	4c. lb.	4c. lb. on copper content
Wire	14¼c.	15⅜c.	15¾	25%	
Rod	12¼c.	15⅜c.	15⅝	4c. lb.	
Angles, channels	21¾c.		23¼	12c. lb.	
Seamless tubing	16¼c.		17⅞	8c. lb.	
Open seam tubing	21¾c.		23¼	20% a. v.	No tax.

TOBIN BRONZE AND MUNTZ METAL

(Duty 4c. lb.; import tax 4c. lb. on copper content.)

Net base prices per pound.	
Tobin Bronze Rod	15¾c.
Muntz or Yellow Rectangular and other sheathing	16⅞c.
Muntz or Yellow Metal Rod	13¼c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.80
Aluminum coils, 24 ga., base price, tons lots, per lb.	30.50

ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (February 5) 47.00c. per Troy oz. upward according to quantity.. (Duty, 65% ad valorem.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.50	2c. lb.
Zinc sheet, full casks (jobbers' price)	9.75	2c. lb.
Zinc sheet, open casks (jobbers' price)	10.50 to 10.75	2c. lb.
Full Lead Sheet (base price)	7.50	2⅜c. lb.
Cut Lead Sheet (base price)	7.75	2⅜c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

(Duty free)

This list applies to either block tin or No. 1 Britannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over	15c. above N. Y. pig tin price
100 to 500 lbs.	17c. above N. Y. pig tin price
Up to 100 lbs.	25c. above N. Y. pig tin price

Lighter gauges command "extras" over the above prices.

Supply Prices on page 42

Supply Prices, February 5, 1934

ANODES

Prices, except silver, are per lb. f.o.b., shipping point, based on purchases of 500 lbs. or more, and subject to changes due to fluctuating metal markets.

Copper: Cast ..... 15¾c. per lb.
Electrolytic, full size, 11¾c.; cut to size 12c. per lb.
Rolled oval, straight, 15¼c.; curved, 16¼c. per lb.
Brass: Cast ..... 14¾c. per lb.
Zinc: Cast ..... 9c. per lb.

Nickel: 90-92% ..... 44c. per lb.
95-97% ..... 45c. per lb.
99%+cast, 47c.; rolled, depolarized, 48c.
Silver: Rolled silver anodes .999 fine were quoted Feb. 5, from 47.00c. per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.95/lb.	$2.65/lb.	$2.45/lb.
10-12-14 & 16	2 to 3½	2.85	2.55	2.35
6-8 & over 16	1 to 2	3.05	2.75	2.55
6-8 & over 16	2 to 3½	3.00	2.70	2.45
6 to 24	Under ½	4.25	3.95	3.75
6 to 24	½ to 1	3.95	3.65	3.45
6 to 24	Over 3½	3.35	3.05	2.85
		Any Quantity		
4 to 6	Under ½,	$5.00	½-1, $4.85	1 to 3, $4.75
1½ to 4	"	5.55	" 5.40	" 5.35
1 to ½	"	5.85	" 5.70	" 5.60

Extras: 25c per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less were quoted February 1:

14" 20 ply 84/92 Unbleached	$57.30-70.96
11" 20 ply 84/92 Unbleached	39.15-48.48
14" 20 ply 80/92 Unbleached	45.95-56.90
11" 20 ply 80/92 Unbleached	31.50-39.01
14" 20 ply 64/68 Unbleached	42.45-52.57
11" 20 ply 64/68 Unbleached	29.14-36.09
Sewed Pieced Buffs, per lb., bleached	40c. to 1.09

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.10½-.11½
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 75 to 400 lb. drums	lb.	.15-.15¼
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls.	lb.	.08-.12
Nitric, 36 deg., carboys	lb.	.06-.06½
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	.095-.11
Denatured drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, com'l., 26 deg., drums, carboys	lb.	.02¾-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide, technical crystals	lb.	.42
Arsenic, white, kegs	lb.	.04½-.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.58
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk)	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.06-.12
Chrome Green, bbls.	lb.	.22
Chromic Sulphate	lb.	.33-.55
Copper—Acetate (Verdigris)	lb.	.23
Carbonate, bbls.	lb.	.15-.18
Cyanide (100 lb. kgs.)	lb.	.39
Sulphate, bbls.	lb.	4.45
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluorspar, bags	lb.	.03½
Gold Chloride ..... Price subject to gold price fluctuations.		
Gum—Sandarac	lb.	.26
Shellac	lb.	.32-.34
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lacquer Solvents	gal.	.85
Lead—Acetate (Sugar of Lead)	lb.	.10-13½
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, 100% synth., drums	gal.	.42½
Nickel—Carbonate, dry, bbls.	lb.	.35-.41
Chloride, bbls.	lb.	.18-.22
Salts, single, 300 and 425 lb. bbls.	lb.	.12-.13
Salts, double, 425 lb. bbls.	lb.	.12-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.08-.093
Potassium—Bichromate, casks (crystals)	lb.	.08⅝
Carbonate, 96-98%	lb.	.08¾
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.05½
Silver—Chloride, dry, 100 oz. lots; Cyanide; Nitrate 100 ounce lots ..... Prices subject to rapid fluctuations of silver market.		
Soda Ash, 58%, bbls.	lb.	.0252
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride ($2NaF.BeF_2$)	lb.	4.30-7.00
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate, granular, bbls.	lb.	3.55-3.70
Nitrate, tech., bbls.	lb.	.03¼-.07
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, fluctuating	lb.	.40
Sulphocyanide	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, fluctuating, 100 lb. kegs	lb.	.38½
Tripoli, powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11-.12
Chloride, drums, bbls.	lb.	.07½-.10
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.03½